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NATURE STUDIES

BOOK II

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Nature Studies

BOOK II

Thirty-six units and projects on
Insects, Fish and Animals
for elementary grades

EDUCATIONAL PUBLISHING CORPORATION
DARIEN, CONNECTICUT

CONTENTS

BUTTERFLIES, MOTHS, BEES

The Evolution of the Tomato Sphinx Moth 4
The Nature Study Club, *L. Alden Marsh* 6
The Spinning Lady of Spiderland, *Dorothy Lauer* 7
Insects, *Mildred Rodgers* 8
We Study Bees, *Margaret E. Parry* 10
Honeybees, *Margaret Fitzsimmons* 11
Ants, *Margaret Fitzsimmons* 12

FISH, FROGS, REPTILES

Snails and Crayfish, *Glenn O. Blough, Ida K. Brink* 14
Queer Flying Things, *C. B. Davis* 16
Frogs, *H. Roll* 18
The Frog Unit, *Noreen Hughes* 19
Scenes in the Life of a Frog 20
Crusty, the Hermit Crab, *Lyla Waterbury Haynes* 22
The Toad, *Evelyne Stone* 23
Spring's Awakening, *Helen A. Smith* 24
Teaching Geography, *Eunice Wentworth* 26
The Turtle, *Fred R. Cagle* 27
Rabbits, Squirrels, Turtles, *L. G. Whiteman* 28

ANIMALS

Preparing for Winter, *Anna F. Deane* 30
Animal Life Work Sheets, *Frances Crahan* 31
The Cat and the Dog, *Mildred Sourwine* 32
Signs of Wildlife in Winter, *Edmund J. Sawyer* 34
Australian Animals 36
The Rabbit Unit, *Jean Currens* 37
Rabbits—Wild and Tame, *Ella Bacon* 38
The Squirrel Unit, *Margaret Fitzsimmons* 40
How Animals Keep Clean, *H. B. Bradford* 41
Wild Animals, *Geraldine Buhr, Dorothy Gilbert* 42
Squirrels, *Gertrude Moore* 43
Turning White, *George King* 44
Animals and Flowers, *J. Buhr, Florence Eastwood* 45
Those Cunning Foxes 46
Animals of the Arctic, *John Watrous* 48
Seals, *Kay Clark* 50
The Zoo, *Evelyn Thurber* 52
A Science Shelf for Your Classroom, *Ida K. Brink* 54

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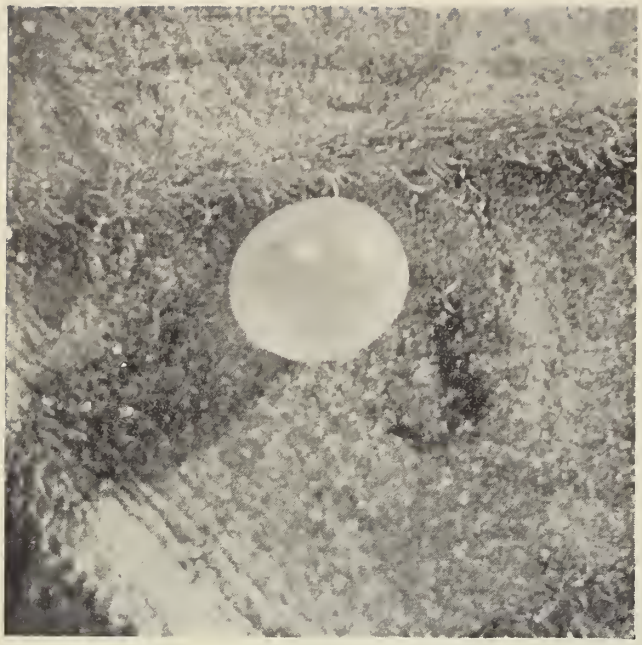
BUTTERFLIES, BEES



1 Mr. Tomato Moth begins life as a tiny egg, so small he can hardly be seen. (Extreme closeup of an egg of the Tomato Sphinx Moth on a tomato leaf.)

2 As a caterpillar he gets a nice juicy dinner from a tomato leaf. (Tomato Sphinx Caterpillar feeding on a tomato leaf.)

3 Mr. Caterpillar, after his heavy meal, rests upon the stem of a tomato plant. What a fierce and ugly looking creature he is! (Closeup of the Tomato Sphinx Caterpillar on a stem in sphinx position.)

4 Mr. Caterpillar becomes sleepy with too much eating and too little exercise and decides he is ready for his long sleep. (Closeup of caterpillar transforming into the pupa, actually showing back of caterpillar splitting and exposing part of pupa.)

Photographs by
Lynwood M. Chace

7 He is very proud of his queer antennae and sharp eyes. (Extreme closeup of head of Tomato Sphinx Moth showing the antennae, eyes and tongue—tongue has been moved from normal position to expose same.)

5 Mr. Caterpillar is much more attractive and, for the moment, less dangerous in the pupa stage of his life than as the "frightful" caterpillar. Here he is! (Closeup of pupa shortly after transformation from caterpillar.)

8 Like many enemies of mankind, Mr. Moth has an attractive appearance because of the artistic markings on his wings and body. (Closeup of wings of Tomato Sphinx Moth, showing pattern on hind wings and abdomen.)

6 After Mr. Caterpillar's long sleep he emerges in his full dignity as Mr. Tomato Sphinx Moth. (Closeup of moth resting on tomato leaf shortly after hatching.)

The Evolution of the Tomato Sphinx Moth

Look out for him on your tomato plants

THE NATURE STUDY CLUB

A PROJECT TO DEVELOP INTEREST IN NATURE STUDY

L. ALDEN MARSH

•

FOR INTERMEDIATE GRADES

OUR Nature Club, which was organized among the children of the training school in a large state normal school, is now a permanent outdoor club, which has for its purpose activities to keep alive in the children the inherent interest which they all have in the beautiful and wonderful outdoor life around them. The following suggestions, based upon our experience, may be helpful to teachers who would like to organize such a club.

MEMBERS AND OFFICERS

The qualifications for membership may be whatever are convenient for the organizer. In a one-room rural school, for example, all the school children might be members. In a city or town where there are Boy and Girl Scout organizations, age limits of from five to eleven years are convenient, for Girl Scouts join at ten and Boy Scouts at twelve.

Very few officers are necessary and these may be either elected by ballot or appointed by the adult in charge. We have a president, a secretary, a sergeant-at-arms, a historian, and a housekeeper. Committees may be appointed as required, but too much machinery does more harm than good. We have, however, developed simple ceremonies of initiation and make use of passwords because children love a little innocent secrecy.

MEETINGS AND ACTIVITIES

We call meetings for various purposes as required, usually once a week, and invite only the ones we want to attend—sometimes the whole club, sometimes the new members, often a small group, such as Orange badge members, or Red badge members.

Refreshments, though not necessary, add to the success of the meetings. Sometimes members bring the refreshments; sometimes they are paid for out of the club dues which, in our club, are twenty-five cents a year. We play all kinds of games both before and after our regular programs, for it is hard to hold children's attention very long, especially if meetings are held after school.

We often take short trips, sometimes to study the trees along a street, sometimes to visit a sympathetic friend who has an aquarium. Occasionally we go to a nearby hillside covered with trees and each takes a little lunch. In summer, we have picnics in nearby parks; fathers, mothers, and friends lending their cars for the transportation of the younger members. As a reward for those who have won a blue ribbon, we take them to a natural history museum in a nearby city. While there, we insist that they look only at a few objects, rest often, and get really to know something about what they have seen rather than just get glimpses of everything.

Talks to individual children adapted to their age and capacity are most valuable. In our club such conferences may be had by any child, on request, after school, on any afternoon except club days.

SOW BUG

YELLOW CLOVER BUTTERFLY

TIGER SWALLOWTAIL

ORANGE GARDEN SPIDER

GROUND BEETLE

SOME OF OUR SPECIMENS

AWARDS OF MERIT

When children join the club they are asked to get a composition book and to write in it a table of contents according to the following classification: Birds, Insects, Spiders, Crabs, Fish, Shelled things, Reptiles, Worms, Amphibians, Mammals, Trees, Shrubs, Vines, Wild Flowers, Cultivated Flowers.

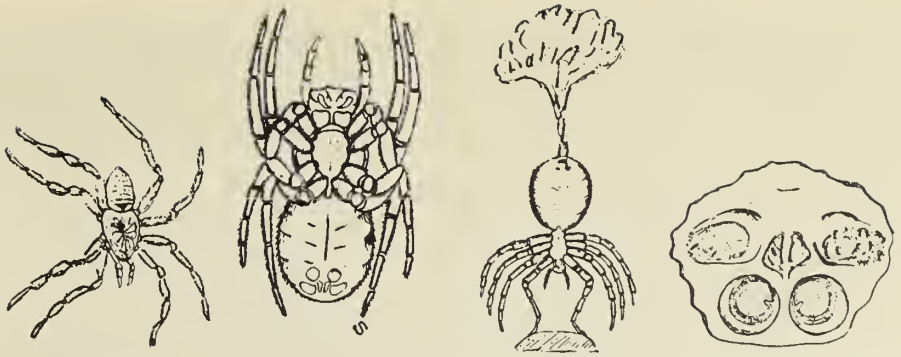
To win a blue ribbon, they must learn to know—not from pictures but from the living thing itself—not less than seventy-five plants or animals from at least five of the above groups, not including cultivated flowers or domestic animals.

To win a red ribbon, they must learn to know twenty-five more. These may include cultivated flowers, but not domestic animals. The requirements for the red badge were purposely made easy so as to encourage the members and to keep them always on the lookout for forms of life new to them.

The yellow badge, however, is harder to obtain. To win this badge, a member must collect and carefully label twenty-five specimens. This, of course, raises the question: "What is a specimen?"

For the purpose of our club the children are told that a specimen is anything that is alive or ever has been alive. A few examples will show how varied the specimens may be, as, for example, a piece of coal or of coral, shells of all kinds, live snakes, live birds, bird feathers, insects, pressed leaves and flowers, seed pods, and so on. To make the requirements easy enough for all to fulfill, we allow them to include five pictures of living things which they have seen. Those who get a yellow ribbon receive a large package of some books on forestry which can be obtained free from the Department of Forestry of our State. (Write to your own state capitol for similar material.)

The next badge is purple and the requirements are as follows: (1) Five kinds of vegeta- *(Turn to page 55)*



TARANTULA MRS. SPIDER FLYING SPIDER SPINNING ORGANS

THE SPINNING LADY OF SPIDERLAND

A NATURE STUDY LESSON

DOROTHY LAUER

HAS it ever occurred to you that a number of creatures of the animal kingdom display an intelligence almost as great as that of the human race? The spider, for example, though usually thought of by most persons as repellent and even dangerous, and looked upon by the small creatures of the animal world as a robber and killer, is in reality a most interesting creature.

> At early morn the spiders spin,
> And by and by the flies drop in;
> And when they call, the spiders say
> Take off your things and stay all day.
> —MOTHER GOOSE RHYME

In her lone struggle for existence, the lady spider has developed some amazing instincts. Necessity forces her to adopt unusual methods of protection, both for herself and for her young. Most important to her self-preservation, however, is her ingenuity in providing food.

The lady spider does all the spinning. In fact, she does practically all the work that is done in Spiderland. This fact, perhaps, accounts for the smallness and weakness of the male spider. When the love-lorn male spider goes a-courting, he decks himself in many bright-colored hairs, and struts and dances before his lady-love. He is careful, however, not to come too close to her vicious claws for, should he not please her, or should her food supply be low, she may decide to eat him for lunch!

How odd it would be to be able to see all around you without turning around! Yet this remarkable faculty is possessed by some spiders, which have from two to eight eyes, according to the species. Mrs. Garden Spider, for instance, who spins the lovely cart-wheel webs you see in your garden, has eight eyes. She lies in wait in the center of her web and, at the slightest disturbance due to the entanglement of an insect, she can see in exactly what part of the web it has lodged. As her meals depend upon speed, she darts out instantly and swiftly ties up her victim.

Not only are spiders well provided with eyes as to number, but they possess two kinds of eyes. The diurnal eyes are adapted to seeing in the daytime and the nocturnal eyes are for night work. The latter are indispensable, for most of Mrs. Spider's weaving and hunting are done under the cover of the dark.

Before weaving her web, the lady spider carefully surveys her building site. Satisfied that it is well chosen, she fastens her heaviest thread to the support she happens to be resting upon and drops to a support below, leaving behind her a silken cable. In a short time, she has cut her space into quarters. Then *(Turn to page 60)*

THE SPINNING LADY'S WEB

THE HEART OF THE WEB

INSECTS

A Good Unit for Fall Classes

Mildred Rodgers

For Primary and Lower Intermediate Grades

SPECIFIC OBJECTIVES

1. To teach appearance, mode of life, habits, work and use of bee, ant, wasp, and gall fly.
2. To find now bees assist in cross fertilization of plants.
3. To learn how to recognize a true insect.
4. To learn care needed for insect bites and stings.
5. To develop appreciation of purpose in life of all living things.
6. To find out how insects differ from one another.
7. To develop appreciation of self-sacrifice of the social insect for benefit of community.
8. To develop appreciation of benefits derived from life of social insect in contrast with that of the solitary.
9. To learn classes and kinds of bees, wasps, and ants.

INTRODUCTION

A discussion about insects.

1. What is an insect?
2. Name some insects.
3. Prove that they are true insects.
4. A spider is not an insect. Why?

A true insect has six legs and three parts to his body: head, thorax, and abdomen.

Choose four insects of immediate interest because of possible first-hand observation.

MOTIVATION

The following items motivated selection of the four insects in this unit:

1. Children brought a dead bumblebee to school.
2. Stories told about experiences with bee stings.
3. Story of ant led to keen interest and observation of large carpenter ant found on playground.
4. Children reported their observations of ant-hills this summer.
5. A live wasp was found on the window sill—probably the queen from the hornet nest brought in by a pupil.
6. Flies emerged from goldenrod galls brought by a child.

BEE

Honeybee

1. Problem: How would you recognize a honeybee?
   - a. an insect
   - b. color—yellowish brown
   - c. senses
     - (1) keen sight; eyes compound and numerous
     - (2) smell and hear with antennae (feelers)
   - d. pollen baskets on hind legs
   - e. four wings
2. Problem: What do bees eat?
   - a. nectar
   - b. pollen
3. Problem: What are the kinds of honeybees?
   - a. workers
     - (1) greatest in number (thousands in a hive)
     - (2) smallest in size
     - (3) do all the work
     - (4) short-lived
     - (5) barbed sting
   - b. queens
     - (1) one in a hive at one time
     - (2) largest in size
     - (3) lay all the eggs
     - (4) smooth sting
   - c. drones
     - (1) few in number
     - (2) smaller than queens
     - (3) do not work
     - (4) killed at the approach of winter
     - (5) no sting
4. Problem: What is the mode of life in the hive?
   - a. social
   - b. number in a swarm (about seventy thousand)
   - c. building the comb.
   - d. laying of eggs by the queen
     - (1) worker cells
     - (2) drone cells
   - e. development of the young
     - (1) the egg; (2) the larva (fed bee-jelly and bee-bread by the workers); (3) the cocoon; (4) the young bee
   - f. other industries in the hive
     - (1) keeping it clean; (2) guarding the hive; (3) ventilating the hive; (4) making wax; (5) gathering nectar and pollen
   - g. developing new queens
     - (1) special cells
     - (2) special food (royal-jelly)
     - (3) destroying other queens in cells
   - h. swarming and the reason for it
     - (1) the new queen
     - (2) the old queen
   - i. kinds of hives used in various countries
5. Problem: Of what use is the honeybee?
   - a. manufactures honey
   - b. assists in cross-pollination of flowers

Bumblebee

1. Problem: How does the bumblebee differ from the honeybee?
   - a. appearance
     - (1) larger
     - (2) color—black and yellow
   - b. mode of life
     - (1) solitary
     - (2) home in the ground
     - (3) wintering
       - (a) only youngest queen survives
       - (b) sleeps in hole in the ground
2. Problem: Of what use is the bumblebee?
   - a. assists in the cross-pollination of flowers
   - b. helps honeybees to gather nectar

Leaf-Cutter Bee

1. Problem: How does it differ from the other two kinds of bees?
   - a. appearance
     - (1) smallest
     - (2) gray in color
   - b. mode of life
     - (1) solitary
     - (2) nest in old soft wood—thimble shaped
2. Problem: What is the work of the leaf-cutter bee?

ANT

A. Problem: How does the ant compare with the bee?
   1. similarities
      - a. social and solitary
      - b. kinds in a community
        - (1) workers
        - (2) drones
        - (3) queens
   2. dissimilarities
      - a. bees cooperative and disinterested
      - b. ants war-like

B. Problem: How would you recognize an ant?
   1. an insect
   2. small ants (red and black ants)
   3. large, brown carpenter ants

C. Problem: What do ants eat?
   1. other insects
   2. honeydew from aphids
   3. grain and crumbs

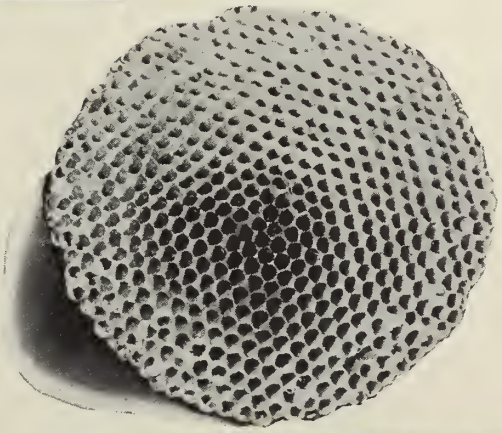
D. Problem: What is the mode of life in an ant-hill?
   1. location and construction
   2. wedding flight
      - a. latter part of June
      - b. queens and drones acquire wings and discard them after flight
      - c. swarm (all of one specie of ant at one time)
   3. egg laying by the queen
      - a. average of one egg every two minutes

(Turn to page 64)

CLOSEUP OF NEST, SIDE CUT AWAY, EXPOSING THE INTERIOR CONSISTING OF FIVE TIERS OF CELLS

YOUNG YELLOW JACKET HORNETS ABOUT TO EMERGE FROM CELLS

CLOSEUP OF ONE TIER SHOWING HUNDREDS OF CELLS



Photographs by Lynwood M. Chace

YOUNG YELLOW JACKET HORNET JUST AFTER EMERGING FROM CELL

QUEEN WASP JUST AFTER EMERGING FROM CELL

We Study Bees

A Unit In Elementary Science FOR PRIMARY GRADES

BY MARGARET E. PARRY

ONE DAY in our science class, while discussing seeds and how they travel, one of the boys became enthusiastic about bees. He had recently visited an uncle who kept them. The uncle was invited to come to school and tell us about bees. When he came he brought his movies which told a vivid story about them. He gave us a bee hive to place in the window so that we could watch the bees. The following unit was developed.

STUDY GUIDE

I.....Social Bees
II.....Honey bees Community
  A.....Kind of bees
    1.....Workers
      a.....Largest class
      b.....Smallest class
      c.....Undeveloped female
      d.....Performs all work
    2.....Males
      a.....Larger than the workers
      b.....Hairy body
      c.....Performs no tasks
      d.....Killed at approach of winter
    3.....Females or Queens
      a.....Same egg as worker
      b.....Different food
      c.....Mating of queen
      d.....Largest body
      e.....Lay eggs
      f.....Has sting
      g.....Care of Queens
      h.....Battles of Queens
      i.....Swarming
  B.....Community life
    1.....Wax secreting
    2.....Care of hive
      a.....Comb building
      b.....Cleanliness of hive
      c.....Ventilation
      d.....Guarding hive
    3.....Egg laying
      a.....How eggs are placed
      b.....Number laid
    4.....Bee scouts
      a.....Getting food
      b.....Getting nectar for honey
    5.....Developing of young
      a.....Egg
        (1).....Size
        (2).....Shape
        (3).....Time to hatch
    6.....Wintering
    7.....Enemies of the bees
      a.....Insects
      b.....Disease
III.....Bumble bee
  A.....Appearance
    1.....Size
    2.....Color
    3.....Sting
  B.....Community life
    1.....Ready made nests
    2.....Wax in cells
    3.....Females live through winter
    4.....Fertilization of flowers
    5.....Guest bumble bee
IV.....Solitary bee
  A.....Carpenter bee
  B.....Mason bee
V.....Value of bee to man
  A.....Honey
  B.....Wax
  C.....Pollenization

PROCEDURE

After the study guide was made we listed ways we may develop it.

1.....Find pictures
2.....Read stories and poems
3.....Write and sing songs
4.....Write stories and poems
5.....Make booklets
6.....Keep word lists
7.....Play games
8.....List social groups

OBJECTIVES

Social Habits
Cooperation
Knowledges
Skills
Appreciation

CORRELATION

1.....Spelling.....New words found in our unit
2.....Reading
  Stories
  Poems
3.....Language
  Picture study
  Stories.....Individual and group
  Plays.....Individual and group
  Poems and Riddles.....Original-group and individual
4.....Music
5.....Art
  Booklets
  Charts
  Posters

REVIEW ACTIVITIES

I.....GENERAL QUESTIONS
  1.....What is the bee's food?
  2.....On what are the young fed? *(Turn to page 63)*

HONEYBEES

A UNIT OF WORK IN NATURE STUDY

MARGARET FITZSIMMONS

•

FOR PRIMARY GRADES

OBJECTIVES

1. To make pupils realize:
   a. How interesting and intelligent honeybees are.
   b. That honeybees work together in groups to build their homes and store their food.
   c. That if it were not for the honeybee, we should have to go without many fruits and vegetables.
   d. That honeybees help the farmer and that they are the only insects which make any contribution to the food of man.

OUTLINE FOR STUDY

The following outline was used to guide the children in their study and observations:

1. Characteristics.
   (1) Winged insect
   (2) Tongue for gathering nectar
   (3) Sight
   (4) Smell
   (5) Hind feet for carrying pollen
2. Food.
   (1) Honey
   (2) Beebread
3. Classes of Honeybees.
   (1) Queens or females
      a. slender with long bodies
      b. lay eggs
      c. have stings
      d. live for about three years
   (2) Drones or males
      a. have no sting
      b. larger than the workers
      c. do not work
      d. are fed by the workers
   (3) Workers
      a. largest class
      b. perform all the work
         (a) make the cells
         (b) care for the queen, drones, and babies
         (c) gather nectar and pollen
4. Apiaries.
   (1) Types of beehive
      a. old fashioned beehive
      b. modern square boxes
   (2) Honey
      a. strained
      b. comb

CORRELATIONS

1. Language.
   a. Oral
      (a) informational sentences about bees
      (b) oral riddles
   b. Written
      (a) informational sentences about bees
2. Reading.
   a. Library books
   b. Charts of new words
   c. Seatwork assignments
3. Spelling.
   a. Simple words taken from vocabulary
4. Art.
   a. Paper cutting
   b. Crayon illustrations
5. Vocabulary. (Arranged alphabetically by pupils.)

A.	fold	poison
air	food	pounds
B.	flight	Q.
bees	G.	queen
boxes	grown	R.
baskets	guard	royal
babies	H.	S.
bread	head	sting
brood	honey	summer
blow	hive	small
busy	hook	sac
C.	J.	smoke
chew	jelly	stays
carry	juice	stomach
comb	K.	sided
clean	kill	scouts
cells	L.	same
cool	legs	suits
clover	lives	swell
close	long	T.
D.	lays	thin
drones	M.	thousand
dry	male	trunk
dust	mother	W.
E.	millions	wings
eyes	N.	wax
eggs	nectar	warm
eat	nurse	workers
F.	O.	water
flowers	opens	winter
fan	P.	wooden
fight	pockets	Y.
flesh	pollen	yellow

TESTS FOR SEATWORK

1. Yes or No Sentences.

Put an X after the sentences that you think are right and an O after those that you think are wrong.

a. Three queens live in one hive.
b. The pollen gatherers fill the baskets on their hind legs with pollen.
c. The drones can sting.
d. Bees gather sweet juice called nectar from the flowers.
e. Smoke is blown into the hive to make the bees sting.
f. Pollen dust is used to make beebread.
g. Bees fan fresh air into the hive.
h. A bee has many eyes.
i. A beehive is kept very clean.
j. A bee fights by using her sting.

Key for scoring: X=Yes, O=No:
a-0; b-x; c-0; d-x; e-x; f-x; g-x; h-x; i-x; j-x.

2. Classification.

Below each of the following column heads write the letters of the sentences which tell about it.

Queen	Drone	Workers
A	B	C

a. I gather pollen.
b. I am the mother of the hive.
c. I am a fat bee.
d. I have to be fed.
e. I lay eggs.
f. I have a short tongue.
g. I make wax.
h. I am very long and thin.
i. I have a long tongue.
j. I like to eat honey.

Key for scoring

A	B	C
b	c	a
d	d	g
e	f	i
h	j	j
j		

3. Blank filling.

Fill in the blanks with the correct word from the list below.

a. Wild honeybees lived in hollow ————.
b. Each bee has her own ———— to do.
c. Bees save enough food for ————.
d. Workers feed the queen ————.
e. Bees carry ———— from flower to flower.
f. The workers are the ———— bees in the hive.
g. When young bees are fifteen days old, they are ready to ————.
h. A bee'ssting *(Turn to page 56)*

ANTS

A CORRELATION OF NATURE STUDY AND OTHER SCHOOL SUBJECTS

MARGARET FITZSIMMONS

FOR PRIMARY GRADES

OUTLINE FOR STUDY

The following outline was developed to guide the children in their study and observations.

I. Parts of the ant.
  1. Head
  2. Thorax
  3. Abdomen
  4. Legs
  5. Wings

II. Classes.
  1. Male
    a. Usually winged
    b. Does not work
    c. Short lived
  2. Female
    a. Largest form
    b. Winged
    c. Lays all eggs
  3. Workers
    a. Smallest form
    b. Most numerous
    c. Does all the work
    d. Wingless

III. Mode of Life.
  1. All species social
  2. Plant dwellers
    a. Nests in dead trees
    b. Nests in living plants
  3. Soil dwellers
    a. Manner of Nests
      Galleries
      Chambers
    b. Regular tasks
      Keeping nest clean
      Securing food
      Feeding young

IV. Choice of Food.
  1. Flesh eaters
  2. Plant lice kept as cows
  3. Seed eaters
  4. Fungus eaters

ACTIVITIES

I. Language.
  1. Oral
    a. Informational sentences about ants
    b. Oral riddles
  2. Written
    a. Informational sentences about ants

II. Reading.
  1. Library books
  2. Charts of new words
  3. Seatwork assignments

III. Spelling.

ant	feelers	holes
soil	wings	food

EDITOR'S NOTE: The study of ants is particularly appropriate for the month preceding summer vacation. At picnics in the country the children will all have experiences with ants and this outline affords an opportunity to lead them to regard these busy little insects not as pests but as very lively objects of interest.

IV. Art.
  1. Paper cutting
  2. Crayon illustrations

V. Vocabulary.

ants	ceiling	moving
male	mushrooms	soil
female	cattle	fighting
wings	cows	brush
wingless	feed	comb
grain	jaws	head
workers	carrying	eggs
clean	nurse	guard
queen	food	door
enemy	pathways	stones
sideways	tunnel	sand
feelers	moving	nest
bottom	eyes	sidewalk
stones	blind	colony
honeydew	soil	swarm
red	battles	milk
black	underground	lice
gardener	milking	leaves
protect	stroke	trees

VI. Types of Seatwork.
  1. Blank filling
    a. Ants have .....feelers.
    b. Ants have .....legs.
    c. An ant has .....parts to its body.
    d. Ants cross their .....when they meet.
    e. Ants move their .....sideways.
    f. Ants have .....on their front legs.

(1) jaws	(4) three
(2) two	(5) six
(3) feelers	(6) brushes

KEY FOR SCORING

(1) e	(4) c
(2) a	(5) b
(3) d	(6) f

  2. Multiple choice.
    a.
    (1) The ant is always
      a. working b. singing c. crying
    (2) The Queen ant takes care of the
      a. workers b. eggs c. cows
    (3) An ant makes its home of
      a. brick b. hay c. sand
    (4) On its legs the ant has
      a. claws b. brushes c. rings
    (5) Ants plant
      a. corn b. mushrooms c. hay
    (6) Some workers are
      a. happy b. blind c. sad
    (7) In its jaws the ant carries
      a. stones b. food c. boxes
    (8) From the cows they get
      a. eggs b. grain c. honeydew

KEY FOR SCORING

(1) a	(4) b	(7) b
(2) b	(5) b	(8) c
(3) c	(6) b	

    b.
    (1) Carpenter ants bore through
      a. fences b. trees c. apples
    (2) The ant uses its jaws for
      a. singing b. flying c. digging
    (3) The ant uses its feelers for
      a. running b. jumping c. tapping
    (4) The ant washes herself like a
      a. bird b. elephant c. cat
    (5) Some ants are
      a. blind b. sad c. happy
    (6) Ants eat
      a. apples b. mushrooms c. corn
    (7) From the cattle ants get
      a. honeydew b. corn c. apple
    (8) The ants build barns for the
      a. workers b. cattle c. Queens

KEY FOR SCORING

(1) b—trees
(2) c—digging
(3) c—tapping
(4) c—cat
(5) a—blind
(6) b—mushrooms
(7) a—honeydew
(8) b—cattle

  3. Yes and No Sentences
    a.
    (1) Ants are very clean.
    (2) An ant has six feelers.
    (3) Ants keep horses.
    (4) The Queen ant takes care of the eggs.
    (5) Some workers are blind.
    (6) Ants make their houses out of grass. (*Turn to page* 55)

FISH, FROGS, REPTILES

GARDEN SNAIL

POND SNAILS

SNAIL FEEDING

SNAILS AND CRAYFISH

MATERIAL FOR NATURE STUDY LESSONS

GLENN O. BLOUGH, Assistant Professor of Science, State College of Education, Greeley, Colorado; IDA K. BRINK

THE SNAIL

1. Questions for study:
   a. Examine a snail under a reading glass and see how much you can find out about it.
   b. How does the snail protect itself?
   c. What does it eat?
   d. How does it eat and move?
   e. Where do young snails come from?
2. Young snails:

Some day, when you are looking at your aquarium, you may find a lump of clear jelly fastened to the side of the glass. Unless you look closely you may not see it because it is almost the color of the glass. If you look at it through a reading glass, you will see that this jelly is made up of many tiny dots. These are snail's eggs.

Editor's Note: The photographs for the illustration of this article were supplied through the courtesy of The American Museum of Natural History.

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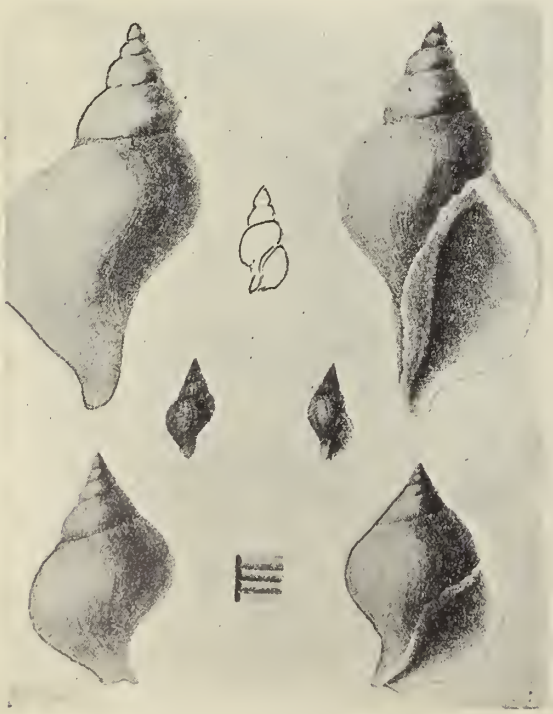
Soon after the eggs hatch, the young snails will begin to creep away from the jelly in which they were laid. Since the goldfish in your aquarium may eat the young snails, you may want to take them out. Should you do this, handle them very carefully and place them in a small jar of water until they have grown too large for the fish to eat. Then you may put them back into your aquarium. Put some water plants into the small jar for the snails to eat. They will need the plants for food as they grow.



SNAILS IN THEIR SHELLS

3. The snail's mouth and tongue:

Many people have never seen the mouth of a snail but, if you look closely when you are watching the snails in your aquarium, you can see the mouth. It is very small and seems always to be opening and closing. The snail is eating as it creeps along over the glass. With a reading glass you may be able to see the tongue when it comes out of the mouth as the snail eats. As the tongue moves back and forth, it scrapes off the tiny plants and animals that live on the glass and the blades of the water plants. These plants and animals—like those that the fish eat—are so small that you cannot see them without a microscope. Sometimes, if the sides of your aquarium are green with these small plants, you may find a tiny path that shows where a snail has cleaned them off the glass.

Some kinds of snails breathe under water, just as fish do, but other kinds must come to the top for air. They take in oxygen in breathing just as fish do.

4. The snail's house:

The snail always carries its house with it. It never needs to go away from home nor to hurry home before dark. Since the day it hatched from a tiny egg, it has lived in its shell-house. A snail could not leave its shell even if it wished to do so, because its soft body parts are fastened to the shell. The hard shell protects the soft parts inside. Some of the softer body parts help to make the shell. As the snail grows, its house gets larger. Perhaps you may notice a small snail and a large one close together. If you do, you will see that, as the snail gets larger, the shell adds more curves to itself.

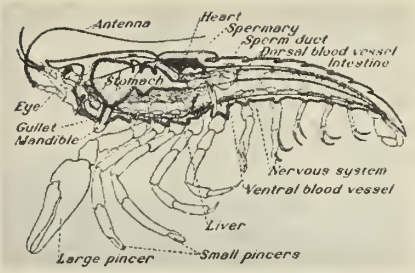
5. The snail's foot:

Watch the snail as it moves. The flat part of the body that presses tightly against the glass is called the foot. A snail you see has only one foot, but that is all it needs to enable it to creep slowly along. Most snails give off a slimy material that helps the foot to slip along easily. If you hold one in your hand as it crawls along you can feel the slime.

6. Things to do:

Perhaps you may like to do some of these things:

A CRAYFISH



ORGANS OF A CRAYFISH

THOMPSON

A FEMALE CARRYING EGGS

a. Draw a snail and label the mouth, foot, and shell.
b. Find as many different kinds of snails as you can.
c. Raise some young snails from eggs and give them to a friend who has an aquarium.
d. Find a picture of a snail's mouth and tongue and show it to your classmates.
e. Look in the woods for snails.
f. Scrape some of the green plants from the glass in your aquarium and put it under a microscope. Show them to your classmates and tell them that snails eat these plants.

THE CRAYFISH

1. Questions for study:
   a. What are the parts of the body of a crayfish that help it to live in water?
   b. What do crayfish eat?
   c. Where would you expect to find a crayfish?
   d. From where do young crayfish come?
   e. What do they do in winter.
2. How crayfish live:

The crayfish is a small animal, with many jointed legs, that lives in fresh water. Many people call these animals crabs, but crabs live only in the salty water of the oceans, while crayfish live only in fresh water lakes and streams.

A small crayfish is easier to keep in an aquarium than a full grown one. The sand and stones in the bottom of your aquarium make a good home for a crayfish. Watch it as it burrows under one of the stones. It will probably spend much of its time sitting under a stone with its feelers sticking out far enough to wave back and forth. Drop a very small piece of fresh meat in front of these feelers and watch the animal jump out after it.

3. The food crayfish eat:

Crayfish live in small burrows under stones in running brooks and, when food floats past them, they spring out to seize it. They catch snails, tadpoles, and young insects as they go swimming by. Sometimes they eat one another. Usually they hunt for their food at night.

4. How a crayfish moves:

You will be surprised to see how very fast a crayfish can move. It can go either forward or backward with great speed and, because of its many legs, it can also easily move sidewise. If you look carefully, you will see, growing out of the body of the crayfish, many different kinds of legs. Some are used for feeding, some for walking, and some to hold the eggs when they are hatching. At the ends of two of the front legs there are large pincers which help the crayfish to catch food. Sometimes they catch hold of the toes of small boys who are wading in a creek where crayfish live! Notice how the back part of a crayfish folds under. When this folded piece is forcibly straightened out, it pushes the crayfish backward through the water at great speed. When you lift a crayfish from the water it often straightens out this "tail" with a quick jerk and spatters water on you. If you always lift a crayfish by the hard shell near the front, it cannot reach you with its long pincers.

5. The shell of a crayfish:

As a young crayfish grows, its outer covering becomes too tight for it. Then a strange thing happens. The hard shell splits across the top and the animal slowly draws itself out of its outer shell. Even the tiny legs come out of their shell-covering. The old shell is left behind but, in a few days, the crayfish grows a new shell that is large enough for it to live in comfortably! Before a crayfish is full grown, it sheds its outer covering several times.

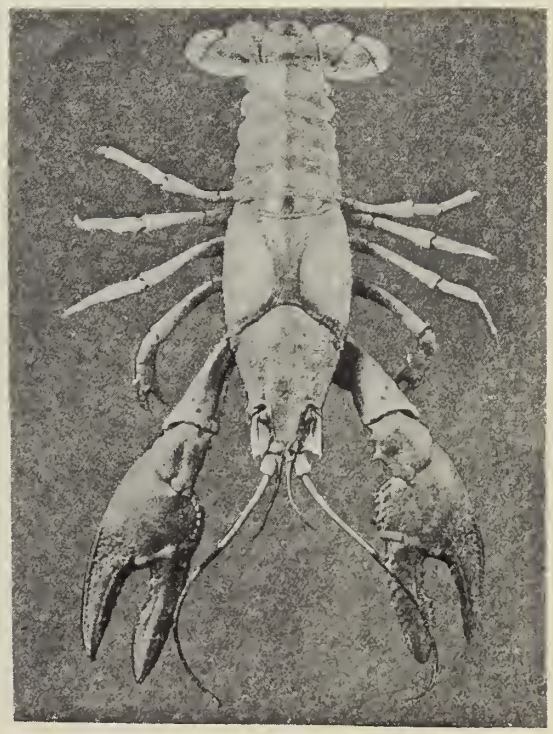
Besides being able to make itself a new shell, a crayfish can do another very interesting thing. If it loses a leg in a struggle with another animal, or by an accident, it grows a new one! Crayfish have been known to grow new feelers and even new eyes!

6. Young crayfish:

Young crayfish hatch from eggs. The mother crayfish fastens the eggs with a glue-like substance under the back part of her body. In spring, you may easily find a crayfish with eggs and keep her in your aquarium until the eggs hatch.

7. Things to do:

Perhaps you may like to do these things:
   a. Go to a brook and hunt for crayfish.
   b. Look carefully at a crayfish as it moves and try to find out which pairs of legs it uses.
   c. Draw a crayfish and name the parts.
   d. Find pictures of crayfish and show them to your classmates.
   e. Keep a mother crayfish with eggs and try to raise the young.



CLOSE-UP OF A CRAYFISH

UNDERWOOD

THE FLYING FOX

QUEER FLYING THINGS

AN APPROACH THROUGH NATURE STUDY TO THE STUDY OF THE AIRPLANE

C. B. DAVIS

MODERN inventors have achieved marvelous results with the airplane and other devices for aerial travel but, long before the airplane was invented, two little animals used a similar principle in successful flight. Both the flying squirrel and the flying fish sail through the air and rise and fall on an airplane of nature's invention.

THE FLYING SQUIRREL

Our common flying squirrel, with a thin, wing-like membrane stretched tightly between its extended legs, is a typical airplane. Thoreau, in speaking of such a squirrel, says: "It sprang from a maple at a height of twenty-eight and one-half feet from the ground, and landed easily and lightly on the ground at the foot of another tree fifty and one-half feet away. Its flight was not a regular descent. It varied from a straight line both horizontally and vertically. It skimmed much like a hawk, and part of its flight was nearly horizontal. There were six trees from six inches to a foot in diameter between the beginning and the ending of its flight, and these it skimmed partly round and passed through their thinner twigs. It did not, as I could perceive, touch a single twig."

THOMPSON

THE FRUIT BAT

Other observers have seen numbers of these little creatures engaged in similar sportive gambols which seemed to have had no other object than playfulness or the mere pleasure of flight. Their movements, however, are not flying as a bird flies, for the membrane that supports their bodies while in the air is motionless and acts somewhat like the parachute of the aviator when he "bails out".

EDITOR'S NOTE: An approach through nature study is a very advantageous way of motivating a unit of activity. This article affords such an approach for an airplane unit.

THE FLYING FISH

The "wings" of the two known kinds of flying fish are the pectoral fins grown to an enormous size. The

FLYING FISH DROPPING BACK INTO THE OCEAN

FLYING FISH IN THE AIR

THE FLYING FROG

COURTESY, AMERICAN MUSEUM OF NATURAL HISTORY

OCEANIC FLYING FISH

COURTESY, AMERICAN MUSEUM OF NATURAL HISTORY

FRESH WATER FLYING FISH

kind most commonly seen is called the flying herring and resembles the garpike. They do not move their fins when flying, but seem rather to float on the wind, their flights sometimes extending, in calm weather, to a distance of more than an eighth of a mile.

When they land on the deck of a ship, as they sometimes do, it is supposed that their flight has been deflected by air currents which the wind makes as it strikes against the side of the vessel and which lift the fish above the deck. Some observers say that they can change the direction of their flight at will, but it is more probable that they are at the mercy of the wind. The flying fish are supposed to leap from the water to escape the attack of a hungry enemy.

THE FLYING FROG

In Java and some other places occurs a remarkable flying tree frog—or, according to some observers, a tree-toad—which has a green back, a white belly, and a bright, orange-colored membrane between its toes, which are tipped by circular disks. This frog, like the chameleon, can change its color according to that of its surroundings. It feeds at night on insects and, when disturbed, can leap out of the tree in which it is seated, and sail away to safety. The membrane between its toes probably acts as a parachute and not as a flying apparatus. The toe disks, like similar enlargements on our common tree-toad, presumably act like suckers to hold the animal firmly in place against the trunk or limb of the tree.

THE FLYING SPIDER

In favored localities these little gossamer spiders occur in such large numbers that the ground and the herbage over a considerable area are often whitened by the threads which they have spun and which, having served their purpose, have been thrown away. Just why this spider takes his floating excursions and why so many are active only in the autumn are not positively known.

In Texas, however, occurs another gossamer spider which has similar floating habits and which uses its sailing webs to carry its young from place to place and thus to scatter them over a wide extent of country. This little creature weighs only about two grains. She spins a hammock-shaped structure of web, cuts it loose when she feels that it has sufficient lifting power, and, with her young ones clustered on her back, sails before the wind, apparently trusting to luck to bring her down in a place favorable for herself and family. Her balloons have been seen floating at a height of from one thousand to two thousand feet and, before a brisk wind, they may fly for a hundred miles or more.

Other queer flying creatures are the bats of which there are about 300 kinds including the flying fox of India, which has a wing spread of nearly five feet, and the fruit bat, which does so much harm in Australia and other tropical countries.

None of these creatures (except the bats), not even those of man himself, are true flying machines. They float and sail in the air only because they take advantage of certain natural laws. The human aviator uses an engine to force his machine forward. The flying squirrels, frogs, and fish start by leaping, and make their descent gradual by the help of a parachute. The (*Turn to page* 57)

THE FLYING FROG

THE FLYING SQUIRREL

FROGS

A NATURE STUDY UNIT WITH CLASS ACTIVITIES

H. ROLL

•

FOR PRIMARY GRADES

FROGS are found in all parts of the United States except in deserts and other arid regions. They are amphibious animals, that is, they are so made that they can live either in air or in water, and they must have access to water to complete their life's cycle. There are many kinds of frogs in the United States but the most common of those found east of the Rocky Mountains are the bullfrog—so called because of his deep bass voice—the spotted leopard frog, the small green frog, the tree frog, and the peeping frog of the meadows, the two last of which are properly called hylas. The species of frogs west of the Rocky Mountains are somewhat different but the life cycles of all are much the same.

LYNWOOD M. CHACE

BULLFROG AND LEOPARD FROG

LIFE CYCLE OF THE FROG

Frogs are hibernating animals. All winter they sleep in the mud at the bottom of a swamp or pond but, when the weather warms up in the spring, the ice leaves the pond, and the frost comes out of the ground, they awaken and come out to sun themselves. Usually we do not notice them until we hear their chorus at night. The male frogs are the singers; the females do not sing. The male takes a deep breath, closes his mouth and nose, and applies pressure to the air between his lungs and his mouth. This forces some of the air into an air sac which swells so as to form the lump which we see under his chin. This "balloon" produces his "voice".

Frogs eat insects but cannot see them when they are still and hence can capture them only when they are in motion. The frog has a very long tongue which is covered with a sticky substance and with which he is a very accurate marksman. When he sees an insect flying about nearby, he takes one well-directed leap toward it and snatches it out of the air with his long tongue.

If you will look around carefully in the tall grasses at the edge of a swamp or pond you will probably find a number of jelly-like masses which look much like tapioca pudding. These are the eggs of a mother frog. Inside the gluelike outer covering of each of them you can see a tiny black speck. Within about a month after the eggs are laid, this speck hatches into a tiny pollywog.

The life cycle of a frog may be divided for convenience into the following stages:

Stage 1. The egg is laid in the water at the edge of a swamp or pond and the young tadpole lives at first on the gluey substance of the egg. Soon, however, he develops a beaklike mouth with which he scrapes from plants and other objects in the water the scum on which he feeds. He is obliged to keep well hidden to avoid being eaten for dinner by a larger tadpole, a fish, or some other denizen of the pond. At first a tadpole swims like a fish with the aid of a tail and is much like a fish in other respects, but he soon changes into an air-breathing animal and must rise to the surface every few moments to breathe.

Stage 2. By the fifth day after he starts to grow, the tadpole has developed a strong tail which enables him to move about freely to obtain pond scum and small water animals for food. He also uses it to escape from his numerous enemies. Only about one tadpole in a hundred lives beyond this stage.

Stage 3. On the eighth day, the tadpole's legs have begun to develop. If one of his toes, or even an entire leg, is bitten off at this stage, it will grow out again; but this marvelous regeneration can take place only during this part of his life.

Stage 4. By the fourteenth day, the tadpole is about twice his size at the previous stage. The right arm now begins to develop and this seems to be quite a painful process. The tadpole moves about very little at this stage but stays near the surface of the pond because the right arm grows at the place where the pore for breathing in water is located. The left arm now begins to develop and after the tadpole gets both front arms, or legs, he can hop out of the water and live equally as comfortably on land.

Stage 5. By the end of the ninth week all four legs have become fully developed.

Stage 6. During the preceding stages, the tadpole's tail has been gradually absorbed and, at about the eleventh week, the tail is completely absorbed and he has become a miniature frog.

Stage 7. A young frog takes from three to five years to develop into a mature adult.

The adult frog is an air-breathing animal although he can remain under water for quite a long time. Hence he can pass at will from the air to the water and back again, either to seek food or to escape from his enemies. He usually stays near the edge of the swamp or pond and, if placed in deep water, will swim frantically toward the (*Turn to page* 55)

THE FROG UNIT

A STUDY OF A FAVORITE ANIMAL

NOREEN HUGHES

•

FOR PRIMARY GRADES

EWING GALLOWAY

I. OBJECTIVES

1. To develop appreciation of nature
2. To develop interest in life and habits of frogs

II. MATERIALS

1. Frogs' eggs
2. Tadpoles

III. GENERAL OUTLINE

A. Location
   1. All parts of the United States except very dry regions

B. Eggs
   1. Location
   2. Size
   3. Number
   4. Appearance

C. Tadpoles
   1. Shape
   2. Manner of breathing
   3. Length of life
   4. Process of changing into a frog

D. Frog
   1. size
   2. eyes, tongue, feet
   3. length of life
   4. hibernation

E. Classes of frogs
   1. Leopard frog
      a. most common
      b. color
      c. number of eggs laid
   2. Peeper frog
      a. size
      b. color
      c. swelling of throat
      d. where found
      e. food
   3. Tree frog
      a. feet
         1. sticky pads on feet
         2. walks like a fly
      b. food
         1. hunts at night
         2. catches ants, gnats, and flies
      c. home
         1. trees
            a. climbs tallest trees
            b. hides in mossy places
         2. water
            a. good swimmer
            b. likes cool, damp places
   4. Uses of frogs
      a. help to destroy insects
      b. food

IV. OUTCOMES

A. Language
   1. oral
      a. informational stories, riddles, poems, etc.
   2. written
      a. informational stories about frogs

B. Reading
   1. children's references
   2. vocabulary chart
   3. seatwork assignments

C. Spelling

jelly	eggs
pond	legs
hatched	spring
frogs	mud
gills	tail
lungs	baby

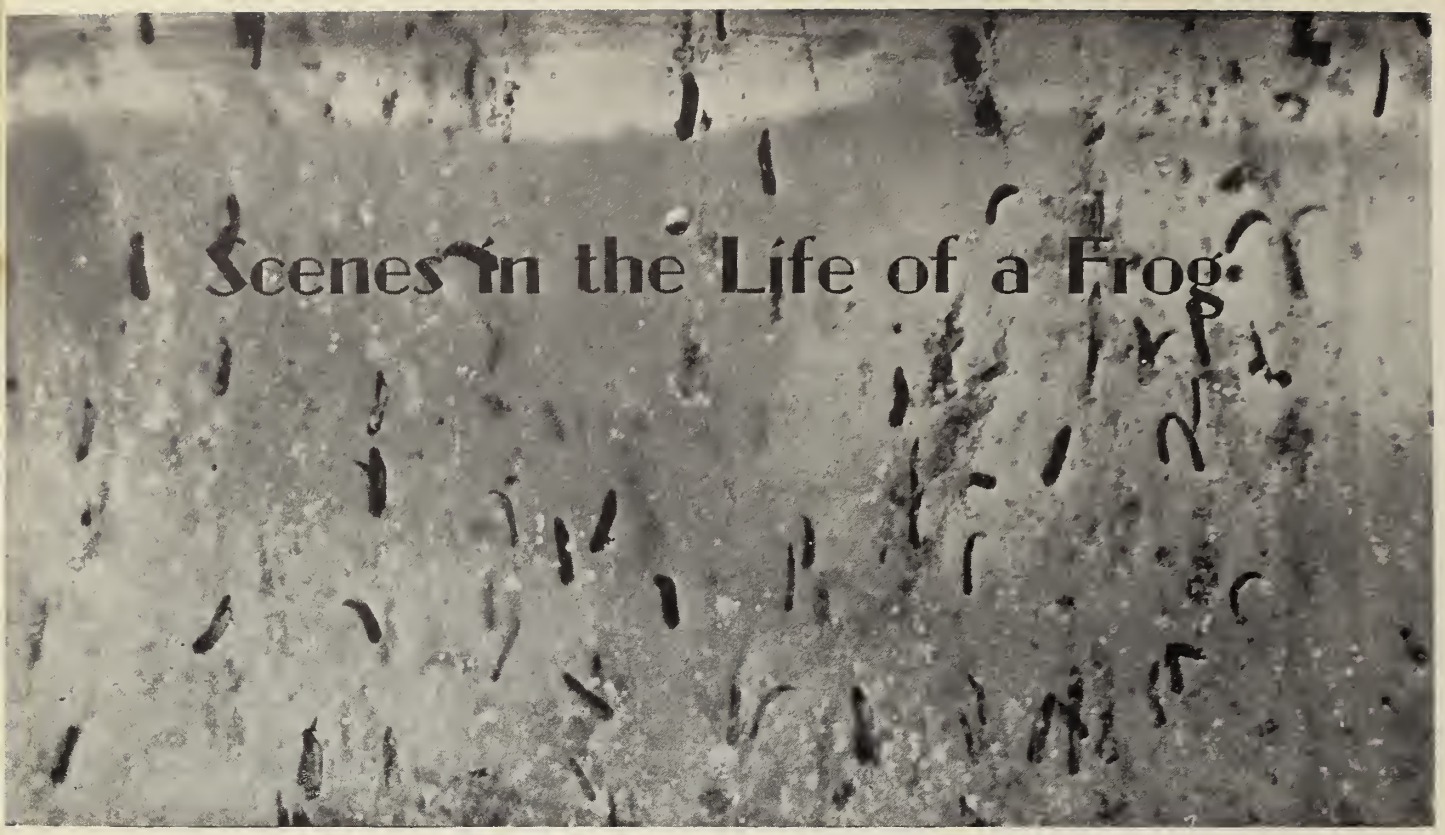
D. Vocabulary

spawn	insects
hibernate	croak
aquarium	hoarse
concert	shrill
weather	tadpole
moist	absorb

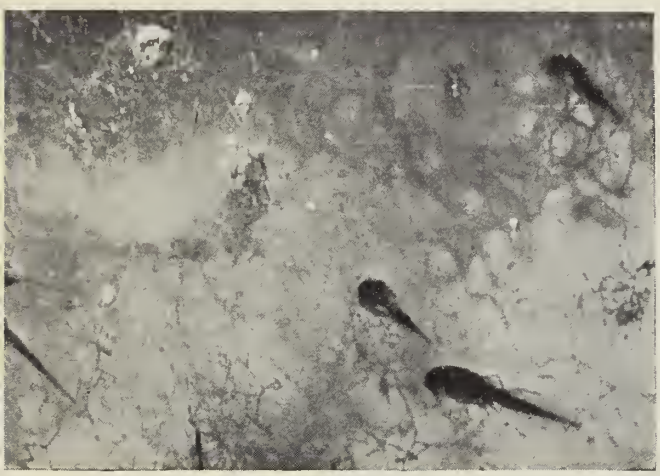
E. Art
   1. Free illustrations, paper cutting, easel work, friezes, etc.

F. Type of seatwork
   1. Write the word that does not belong (phonics)
      a. frog spring song book
      b. tadpole milk swimming eggs
      c. hat pond flies pollywog
      d. trees girl bark moss
      e. hops jumps sings dances
      f. gills lungs flag breathe
      g. legs swing tail mouth
      h. gnats flowers mosquitoes
   2. Matching—tiny peepers
      1. Peepers are.....
      2. A peeper is about.....
      3. A peeper puffs his throat.....
      4. The eggs of a peeper.....
      5. A peeper has a sweet.....
      6. Peepers are heard very.....
      7. Peepers change colors.....
      8. Some peepers climb.....
      9. Peepers' eggs look.....
      10. Peepers still sing in.....
         a. are very tiny
         b. little song
         c. early in spring
         d. very small
         e. like the tree frog
         f. look like seeds
         g. late autumn
         h. one inch long
         i. to tops of trees
         j. out like a balloon
   3. Classification
      1. Frogs 2. Tadpoles
         a. water breather
         b. long tail
         c. lung breather
         d. uses gills
         e. sleeps all winter
         f. croaks
         g. hops
         h. is like a fish
         i. has arms and legs
   4. Multiple choice
      1. A tadpole has ..... a. arms b. legs c. tail
      2. A frog breathes through ..... a. gills b. lungs c. air
      3. A frog buries himself in ..... a. water b. straw c. mud
      4. A tadpole loses his ..... a. head b. tail c. ears
      5. Young tadpoles do not have any ..... a. heads b. mouths c. bodies
      6. The ..... hatches the tadpoles. a. mother b. sun c. water
      7. A frog grows until he is about ..... years old. a. ten b. two c. five
      8. A frog ..... all winter. a. hibernates b. works c. hops
      1. Leopard Frog 2. Peeper Frog 3. Tree Frog
      a. smallest
      b. most common
      c. changes color
      d. climbs trees
      e. three to four inches long
      f. sits for hours
      g. sticky pads on feet
      h. heard very early in spring.

(*Turn to page 61*)

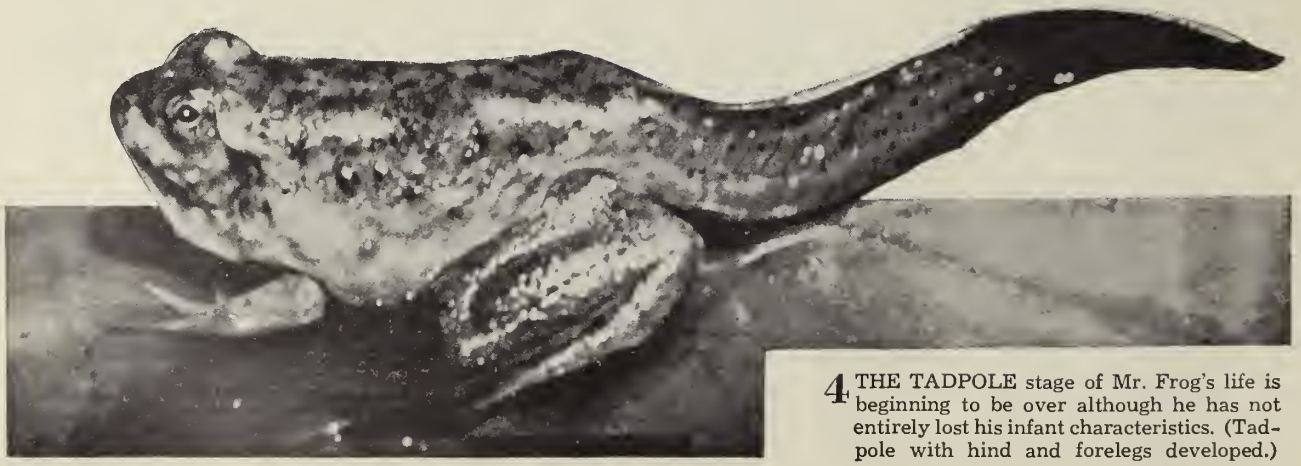


1 MR. FROG starts life as a mere atom imbedded in a jelly-like substance. (Tadpoles in albumen, as seen under water.)



2 MR. FROG begins to look like a real tadpole though he is still very much in his infancy. (Tadpoles in a more advanced stage hiding in water plants.)

3 MR. FROG after his third week as a tadpole changes his appearance remarkably. (Third week development.)



4 THE TADPOLE stage of Mr. Frog's life is beginning to be over although he has not entirely lost his infant characteristics. (Tadpole with hind and forelegs developed.)

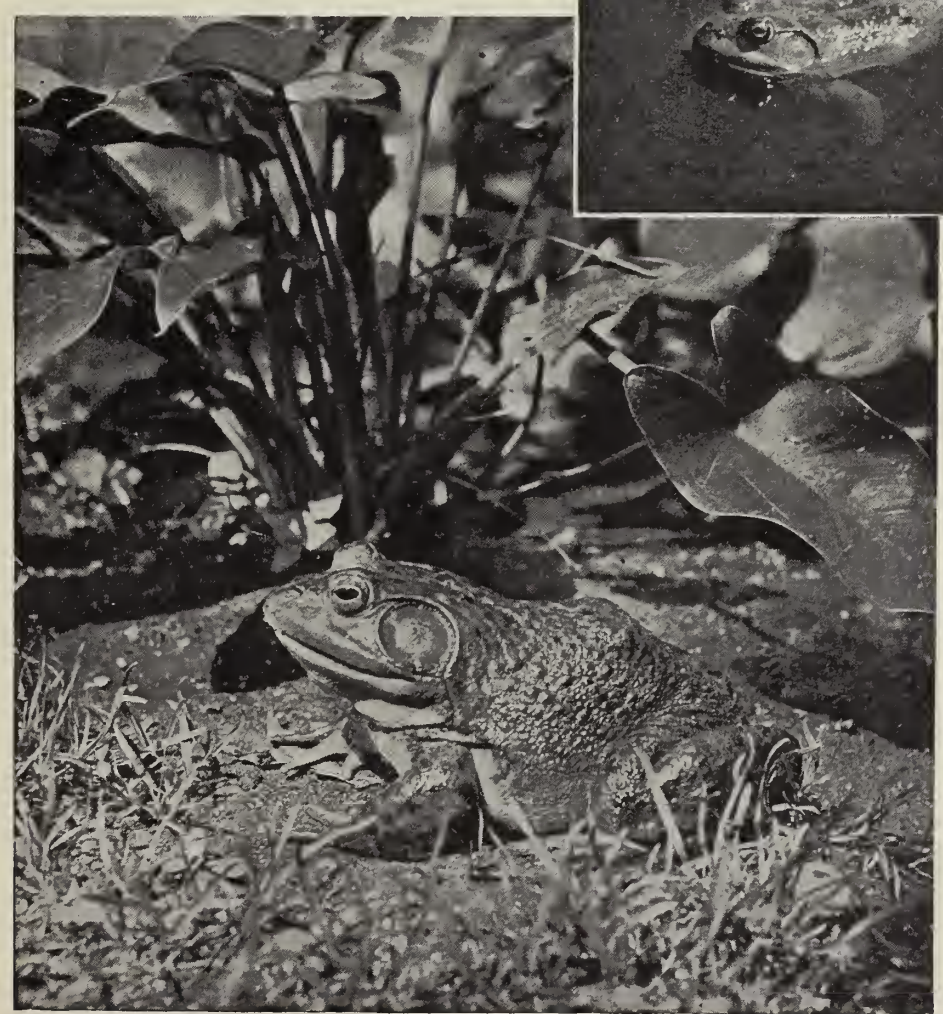
5 NOW he is beginning to look like a real lively frog and will soon have forgotten all about his tadpole experiences. (Tadpole with tail about half absorbed.)

6 HERE is our young Bullfrog looking quite fit and eager for adventure in the outside world. (Young Bullfrog after tail has been absorbed.)

Lessons in Elementary Science

Photographs by Lynwood M. Chace

7 HE IS now a grown-up Bullfrog, ready to go forth and seek his fortune. (Adult Bullfrog swimming to surface of water.)



8 MR. BULLFROG sits among the lily pads on the shore and meditates about his future problems. (Bullfrog resting on shore of pond.)

Crusty, the Hermit Crab

A Science Story and Song

LYLA WATERBURY HAYNES

Crusty was only a quarter of an inch long. He didn't have a mother or father. He didn't have a home. Poor little Crusty, the baby Hermit Crab!

Crusty wished that he had a home. He needed it, too. Only that morning he had been resting in a tidepool, when a Sandpiper came along. He had come closer and closer until he was almost upon Crusty.

You wouldn't expect such a young crab to know much, but just in time he slid into the pool out of Mr. Sandpiper's reach. The Sandpiper strained and stretched but he couldn't quite pick up Crusty with his sharp bill. If his neck had been longer, like a flamingo's, he would have had a delicious luncheon. But Crusty remained right where he was in the blue water. Mr. Sandpiper stood around for awhile. He smoothed his white feathered vest and straightened his speckled coat which looked like the sand. Still nothing happened. The little crab did not move. It isn't much fun waiting around, so pretty soon Mr. Sandpiper gave up, and went down the shore, bowing and teetering and looking for sand fleas, which were easier to catch anyway.

All this had frightened Crusty, so he set out at once to find a home. He would never be safe until he backed himself into a shell. Then Mr. Sandpiper couldn't get him, or if he did, Mr. Sandpiper would have a good stomach ache. Indeed, eating shells would not agree with anybody!

Crusty dragged himself over the sand. After awhile he found a small empty periwinkle shell house. It looked quite homey so he entered. He backed in and closed the door by putting his hard shelled claw into the opening.

Crusty was happy in his new home. He felt safe and contented. He thought he would live there forever. Little did he know how soon he would be forced to move.

One day Crusty felt something pinching him. It isn't very nice to be pinched and he wondered what it could be? He looked around to see if he had company. But there wasn't a soul nearby! Imagine how surprised he was when he discovered that he had grown, and the shell apartment had become too small. His house felt like a shoe that is too tight but he squeezed himself back into it again. He wasn't going to take a chance of Mr. Sandpiper catching him out of doors.

Next morning Crusty bumped along looking to right and left. He knew exactly the kind of shell house he wanted. It wasn't long before he found one which seemed to be vacant. To make sure he thrust in his claw and felt around.

Inside he found a greenish clam worm. That was all right. Crusty was in luck, for clam worms are nice to have around. They eat all the little bugs which come in to bother. So Crusty quickly changed houses.

The roommates got along well and were contented together for some time. After awhile the shell house which had been so roomy at first began to be crowded. So Crusty knew he must be growing again. He had grown larger and stronger so he started out at once to find a larger house.

(Turn to page 57)

THE HERMIT CRAB

Lyla W. Haynes *Helen T. Burdette*

Her-mit crab, you seem in - tent on find - ing an emp-ty shell for rent; This va-cant a-part-ment be-
rit. - - -

THE TOAD • A HELPFUL GARDEN WORKER

EVELYNE STONE

ONE of the most fascinating workers in our Victory gardens this summer will doubtless be the helpful little toad. Children are always interested in this queer little creature and therefore he makes a very good subject for a unit of work or a story-type lesson. Very likely your class has already worked out such a unit or lesson. The little quiz on this page may be used in connection with your unit of activity or it may be given as a separate nature test.

If the children have not already studied the toad in the manner indicated above, another way to use these questions is to give them to the class and let them search for the information required. Then it may be the basis of a lively question-and-answer period with great excitement as to who has been able to answer the largest number of questions about the gardener's friend.

To check the score, count 5 for each correct answer. A grade of 90 to 100 per cent is excellent; 80 to 90 is very good; and 70 to 80 is good. Below that—well, the children will see that they do not know much about toads!

1. Has Mr. Toad lived in your garden ever since the day he was hatched? YES NO
2. Are all Mr. Toad's relatives tadpoles when they are first hatched? YES NO
3. Are any of his relatives less than two inches long? YES NO
4. Are any of his relatives more than six inches long? YES NO
5. Does Mr. Toad drink as we do? YES NO
6. Does he eat much? YES NO
7. Is his tongue fastened in the back of his mouth? YES NO
8. Does he have any teeth? YES NO
9. Is it true, as some people believe, that Mr. Toad can live many years without air? YES NO
10. Is it true that you will get warts if you handle Mr. Toad? YES NO
11. Should we protect Mr. Toad? YES NO
12. Does Mr. Toad have as many enemies as Mr. Frog? YES NO
13. Does he have any way of protecting himself against enemies? YES NO
14. Can Mr. Toad and his relatives live a long time? YES NO
15. Are Mr. Toad's legs as long as Mr. Frog's? YES NO
16. When he sheds his skin does he leave it lying on the ground? YES NO
17. Does Mr. Toad like to live in damp places better than in dry places? YES NO
18. Do you see Mr. Toad oftener during the day than at night? YES NO
19. Does Mr. Toad cover himself up when he goes to bed? YES NO
20. Do you see Mr. Toad hopping about in your garden all winter? YES NO

HERE ARE THE ANSWERS:

1. No. In the beginning, he was a tadpole and lived the first part of his life in water.
2. No. The "Jack-in-the-box" toad that lives in South America looks just like its mother when it is hatched.
3. Yes. The oak toad is only three-quarters of an inch long and is found in the southeastern part of the United States.
4. Yes. The Giant Toad that lives in Arizona and California is seven inches long.
5. No. He drinks by soaking himself full of water.
6. Yes. He fills up his stomach four times a day. To do this he must eat nearly all the time. During the summer he can eat as many as ten thousand insects.
7. No. His tongue is fastened in the front of his mouth, so that he can throw it far out and catch insects and other food.
8. No. Unlike Mr. Frog, Mr. Toad has no teeth. He does not need any as his diet is made up mostly of insects and worms, which he swallows whole.
9. No. Mr. Toad needs air just like any other land creature.
10. No. There is no danger of Mr. Toad's causing warts if you handle him.
11. Yes. Mr. Toad destroys garden pests such as spiders, ants, potato bugs, plant lice and beetles.
12. No. His only real enemies are the snakes.
13. Yes. In the glands behind his head is a secretion which comes out in little beads on his skin and has a very unpleasant taste. Snakes are the only enemies who do not seem to mind this. Also, Mr. Toad is protected by his color, which is almost like that of the ground, making it difficult for him to be seen.
14. Yes. Some toads who are lucky enough to avoid their enemies have been known to live thirty-five years.
15. No. Mr. Toad's legs are shorter than Mr. Frog's and are better suited for walking than for jumping.
16. No. He swallows it.
17. Yes. He likes to live in damp, cool places where there are stones to hide under.
18. No. He likes to sleep during the day and go out food-hunting after the sun has gone down.
19. Yes. He kicks himself into bed. He pushes himself backward into loose sand or dirt and twists himself about until he is completely covered up.
20. No. He buries himself in the ground and sleeps there all winter long.

CUTOUT BY JENNIE M. HAVER

SPRING'S AWAKENING

A STUDY OF SPRING INTERESTS WITH RELATED ACTIVITIES

HELEN A. SMITH

•

FOR PRIMARY GRADES

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WOODLAND NEIGHBORS

Our study of spring's awakening was initiated through the children's interest in bringing to school branches of pussy willows to show to the rest of the children. This led them to discuss the coming of spring. One child offered to bring to school a picture which he had seen in the Sunday paper of two baby cubs and their mother just coming out of their winter home. The class became very enthusiastic and we decided to record the signs of spring.

SIGNS OF SPRING

Children's Suggestions

Pussy willow trees—where they grow

frogs and toads	turtles
snakes	bears
rabbits	butterflies

LANGUAGE

The children composed the following stories about spring interests which were used for silent reading and as illustrations to stimulate individual pupils to write stories of their own of similar character.

Our Pussy Willows

Donald brought us some pussy willows.

Pussy willows grow in wet, swampy places. Donald found his on the side of a hill near a pond.

Pussy willows have little gray buds that are soft and furry. That is why they are called pussies.

Pussy willows are among the first signs of spring.

We have some pussy willows in a vase in our room.

Frogs

The frogs have been asleep under the ground all winter. Their homes have not been warm.

Sometimes the frogs freeze solid but that does not kill them.

They come out of their winter homes when the sun becomes warm in the spring.

They are just beginning to leave their homes now. They hurry down to the pond to lay their eggs. Their eggs look like white jelly with black spots in it. These black spots hatch into baby tadpoles.

Baby tadpoles do not look like frogs. They have only a little round head and a long tail. Soon little stubs grow on the tail. Then these grow into legs.

When tadpoles get legs and can hop, they leave their home in the water and live on the ground. They are not tadpoles then. They are frogs.

Another name for a tadpole is polliwog.

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ARE THEY REALLY YOUR EGGS, MRS. SPOTTED TURTLE?

Toads

Toads are useful animals because they eat insects in the gardens.

They eat flies, worms, bugs, and other insects. Toads keep insects from eating garden vegetables.

They catch insects with their sticky tongues.

Toads drink with their bodies. They lie in the water and let it soak into their skins.

The enemies of toads are snakes, hens, ducks, hawks, and owls. Many animals like to eat toads.

The Rabbit

There are two kinds of rabbits, pet rabbits and wild rabbits.

I. Pet Rabbits

A pet rabbit needs much care. He needs a good clean place to live. A clean box makes a good home for him.

A pet rabbit needs two meals a day. He likes to eat carrots, lettuce, cabbage, clover, and green grass. He likes to eat his vegetables raw. Cooked food does not agree with him.

A pet rabbit needs fresh water two or three times a day.

A rabbit makes a good pet for little children. Children who have pet rabbits should not let them run out of the yard.

II. Wild Rabbits

A wild rabbit has to take care of himself. He must watch for danger all of the time.

He uses his ears, eyes, nose, legs, and wits to protect himself.

When danger is near, he runs to a briar patch.

Mother rabbit thumps on the

© LYNWOOD M. CHASE

MR. TREE FROG

ground to tell her babies that danger is near.

Baby rabbits watch the cotton under mother's tail. It is like a light. When mother sits down, the light goes out. Then the baby knows he must sit still, too.

A wild rabbit eats what he can find in the woods. He lives in a hollow stump or tree.

Many large animals hunt wild rabbits for food.

Men hunt them, too.

The rabbit's fur changes color in the spring.

Some fur coats are made of rabbit's fur.

The Bears

Katharine found a picture of two little bear cubs and brought them to school.

They were born in February, but Mother Bear would not let them come out of their home until spring was here.

Baby bears are always born in pairs.

When bears walk, their tracks look like men's tracks.

They can stand up on their hind feet.

Bears just love honey. They will tear down a bee's nest to get the honey.

Caterpillars

We have had a cocoon in our room all winter.

In the fall, the caterpillar spins a house for himself. He sleeps in this house all winter.

This house is called a cocoon.

When the warm sun shines in the spring, it wakes him up.

When the caterpillar comes out of his cocoon, he is not a caterpillar. He is a beautiful butterfly.

The butterfly will fly in the woods and gardens and lay eggs.

When the eggs hatch, they are not butterflies but they are small caterpillars.

Other Animals

Many little animals sleep during the winter.

Snakes bury themselves deep down in the ground. In the spring, the warm sun wakes them. They crawl out of their holes and begin to look for food. Snakes eat flies and insects. Many people are afraid of snakes, but most snakes around here are not poisonous.

Turtles sleep in the bottom of the pond all winter. They have nothing to eat either. The sun wakes them up, too. The turtles dig a hole in the sand, lay their eggs in it, cover them up and leave them there. The sun hatches them.

Snails and crabs bury themselves deep in the mud at the bottom of the bay shore. The warm spring wakes them up, too.

The Turtle

We have three turtles in our room. One is middle-sized, and two are small, baby turtles.

They are painted turtles. Their undershell has many pretty colors. There are yellow, orange, red, green, and black checks on the undershell. The middle-sized turtle's back is brownish black. The baby turtles' backs are green with black lines.

Turtles' feet are webbed. That helps them to swim.

Their feet have claws on them.

Their heads look like snakes' heads.

Turtles live in the water. They like to come up on the sand to sun themselves.

Feeding The Turtles

Catherine and Lois brought meat for the turtles.

We broke the meat up into pieces.

The big turtle ate as much as he wanted and left the rest of it alone.

The little turtles seemed not to eat much.

We watched the big turtle nibble on some lettuce leaves.

Turtles should be fed twice a week.

Turtles that live in the ponds eat snails, worms, and minnows.

CLASS ACTIVITIES

1. Reading.
   a. Stories from books on library table.
   b. Poems.
2. Spelling.
   a. Words needed to write short stories and sentences.
3. Writing. Short stories about spring activities.
4. Music. Spring songs.
5. Art work.
   a. Pictures of spring activities.
   b. Draw pictures illustrating the stories given above.

TESTS

1. Multiple Choice.
   Yes and No Sentences.
   If the sentence is true, write yes.
   If the sentence is not true, write no.
   a. Mother toad has a beautiful voice.
   b. A toad's tongue is very sticky.
   c. A toad catches insects with his tongue.
   d. Toads and frogs are the same kind of animals.
   e. A frog's eyes are on top of his head.
   f. A toad's teeth are very sharp.
   g. A toad has (*Turn to page* 62)

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MRS. WOODPECKER AND HER CHILDREN LIVED IN A SHOE

L. M. CHACE

MRS. FROG'S FAMILY STUDIES TURTLE EGGS

Teaching Geography

Through Nature Study and Elementary Science

Eunice Wentworth

THE GIANT TORTOISE KEYSTONE

Some courses of study do not list geography as a required subject in first and second grades. They prefer, instead, the term Elementary Science, or perhaps simply Nature Study. This is quite correct, because the elements of both these subjects really are the foundational preparation for studying the more formal subject of "Geography—As the Home of Man."

The following outline suggests the scope of content usually expected to be covered in these grades.

SUGGESTED OUTLINE FOR WORK

There should be much field work, through excursions and field trips. Observations should be of simple character. The object of the study of plants is to arouse interest in the *homes* of plants and animals. Let LIFE be the thought emphasized throughout. In studying plant and animal life, uses and relationships are the greatest interest to small children. Use many nature myths and other stories. Let the children think of geography as an interesting way of finding out all about the earth on which they live.

Select from the following topics subjects suitable for observation and conversation in the first and second grades.

Landscape in our town at different times of day and night.

Life—plant, animal, man—as related to soil, water, etc.

Forms of water as they affect our lives.

Winds as they affect our lives.

Weather observations.

Observations of heavens. (Simple astronomy)

Direction—in terms of home geography.

Distance—(From local distances get idea of longer distances.)

SUGGESTIONS FOR TEACHING THESE TOPICS

1. Terms—Teach children to use correctly terms—up, down, upper, lower, over, under, above, below, right, left. Connect this work with other subjects such as physical education.

2. Landscape—Lead children to see and appreciate the outdoor pictures by which they are surrounded in their own home environment. Lead them to observe and to talk about slopes, hills, valleys, brooks, lakes, ponds, mountains near their homes.

3. Interesting Life Subjects.

Plants

Recognition of a few wild and cultivated plants.

Needs, or conditions, for growth of plants.

Home and habits of plants.

Friends and enemies of plants. (Important in our Victory garden work.

Change of season, effects of weather on life of plants.

Use to man—to other living things.

Animals

Observation of some common animals, domestic and wild. Study especially the birds.

Needs of birds. How supplied? What can children do to help?

Homes and habits. Compare children's love of their own homes with the needs and love of birds for their nests. Why should we never destroy a bird's nest?

Weather

In their season, observe clouds, fogs, mists, rain, snow, hail, ice, frost. Notice appearance, formation, effects Notice changes in seasons and effects on man, plants, and animals.

Heavenly Bodies

Sun, moon, pole-star, great-dipper, morning star, evening star.

People

Our own social life.

Stories and pictures of children of Hot Lands.

Stories and pictures of children of Cold Lands.

Stories of Our Good Neighbors—Canada, Mexico, South America, etc.

Stories of our friendly allies—the Chinese, their home life, customs, etc.

(*Turn to page* 62)

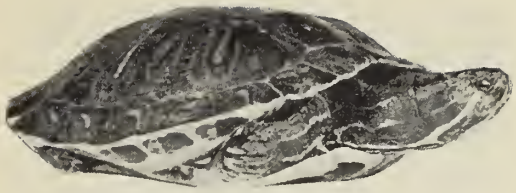
THE TURTLE

A UNIT IN ELEMENTARY SCIENCE

FRED R. CAGLE

•

FOR PRIMARY GRADES



THE SLIDER TURTLE

Common throughout Central and Southern States this turtle is a valuable source of food.

SUGGESTIONS FOR TEACHING UNIT

Turtles should be placed in the school aquarium a few days previous to the beginning of the unit. They will stimulate the pupils' interest and will prepare the class for the unit.

Small turtles may be purchased at pet shops or they may be collected around streams and ponds during spring and summer. They are easily kept in the school room. An aquarium or large glass bowl should be partially filled with water, and a large rock should be placed in it. The upper surface of the rock should protrude from the water and provide a dry area upon which the turtle can crawl. Turtles should not be forced to remain continually in the water. Small pieces of liver, insects, or prepared turtle food purchased at the pet shop will provide sufficient food.

SUNNING

This turtle crawled onto the log in the full rays of the summer sun.

OUTLINE OF STUDY

A. Objective.

To teach interesting facts about the life history of turtles and to learn how they are of importance to man.

B. Procedure.

1. Motivation.

   Arouse interest by showing turtles to the class and telling a few interesting facts about them. Allow the children to tell about their experiences with turtles.

2. Teaching.

   Have the class work out and illustrate life facts about the turtle, on the basis of their own observation. The teacher places the turtle where the entire class can see. She may proceed after this fashion: "In our science classes, we have discussed how we learn by observation. Let us see what we can learn about this interesting creature by observation. Do you see anything unusual about him?"

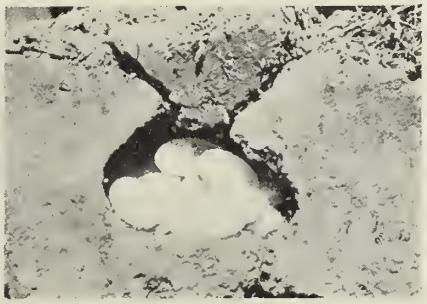
   The pupils will volunteer suggestions. Some pupil will observe that the turtle has a hard, bony shell and the class may conclude that the turtle is a clumsy animal. Other observations might be: Webbed feet indicating life in the water; sharp, powerful jaws indicating that it eats heavy food, etc.

   The teacher should emphasize the importance of turtles to man —their value as food and scavengers, and the harm they do as predators and pests to fishermen.

3. Read stories about turtles.

C. Class Activities.

1. Let the class appoint committees for the care of the turtle.
2. Make a turtle design for the blackboard or a bulletin border, to be used during the time of the study. Make a turtle booklet.
3. Design a poster showing interesting events in the life of a turtle —such as stealing fish for food from the fisherman's hook. ("Mr. Turtle Becomes a Thief.") Show him as a scavenger and, finally, asleep on a log in the sun. One poster may be made featuring all three events and may be entitled, "Mr. Turtle has a Busy Day" or, "A Day in the Life of a Turtle".

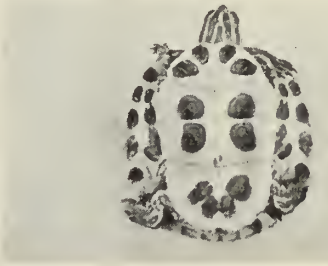


A TURTLE NEST

This is a cross section with the mud plug sealing the nest loosened. Weeds and debris are mixed with the mud seal and aid in effectively concealing the nest.

FACTS FOR THE TEACHER

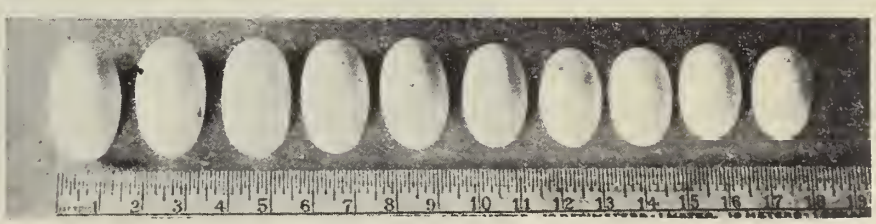
There are at least sixty-four different kinds of turtles in the United States. These may be separated into three major groups: those that live almost entirely in the water, the soft-shelled turtles; those that spend most of their lives in the water but often travel about on the land, the Painted Turtles, the Slider Turtles; and those that spend their entire lives on the land, the Box Turtles, the Gopher Turtles.



FROM BELOW

The undersurface of a Slider Turtle is well-protected by a bony plate.

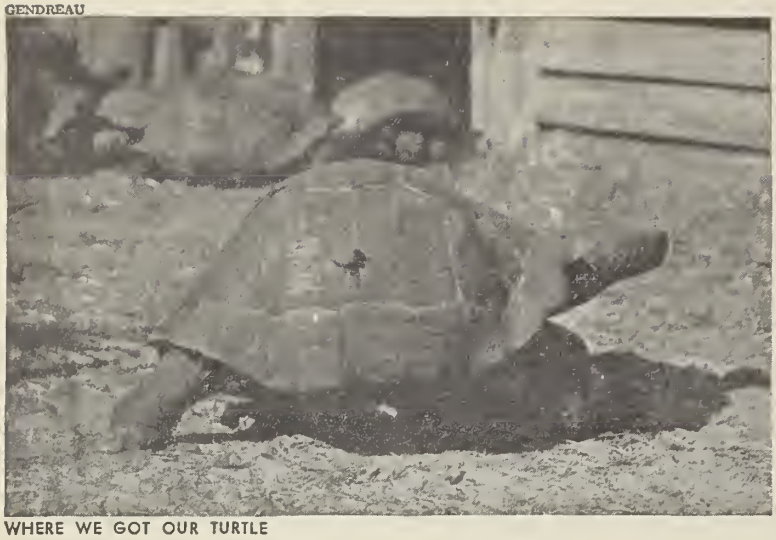
All turtles are alike in that they have a bony shell formed from the union of the much flattened ribs covered by a layer of horn. When the turtle withdraws its (*Turn to page* 64)



EGGS OF THE MUSK TURTLE

These were taken from several nests and vary considerably in size. The Musk Turtle usually lays four eggs.

GENDREAU



WHERE WE GOT OUR TURTLE

SOZIO

OUR SQUIRREL

RABBITS • SQUIRRELS • TURTLES

A Unit on Our Schoolroom Pets • For Primary Grades

L. G. WHITEMAN

THE STUDY of pets affords excellent material for your reading readiness program, for children naturally have a keen interest in them.

The possibilities for building language experiences, teaching factual material, encouraging creative abilities, and formulating desirable habits are far reaching.

In addition, it enriches the child's background and lays a foundation for the reading of books which abound in stories about pets. In this way reading becomes an alive and meaningful subject.

OUR OBJECTIVES

To provide a center of interest out of which will evolve such habits as courtesy, responsibility, initiative, cooperation, talking before the group, experience in talking in turn.

To make the getting acquainted days happy and interesting.

To make a richer reading and speaking vocabulary.

To create a happy, inquisitive attitude towards reading.

To increase children's information about pets.

OUR APPROACH

Interest in the unit in our room was aroused by having a squirrel and a couple of turtles brought in. Then it was suggested that we get a rabbit. The next question was how to make a home for one and the kind we would need.

The class searched through pictures and books until they found a rabbit hutch. Our janitor was asked to make it and in a short time we had our rabbit properly housed. The next step was the naming of the pets. The following names were chosen: Joe, Bobbie, Tim, and Peanut. Name labels were then placed over each home.

MONKMEYER

OUR RABBITS FIND A NEW HOME

The children decided what they wanted to know about each pet and charts were printed separately.

The rabbit chart was as follows:

What will Joe, our rabbit, eat?

What do we need for his hutch?

Why does he have long ears?

How does Mother Rabbit care for her babies?

How does she make her nest?

What will our rabbit need for food?

How can we make him feel at home?

TEACHING

Each pet was examined carefully, calling attention to its physical characteristics—eyes, feet, tail, paws, body covering, ears, etc., its movements; climbing, jumping, crawling, and hopping. Then housing and food for each kind of pet were considered.

The children cared for our pets by bringing their food, feeding them and cleaning their homes, thereby giving a sense of responsibility.

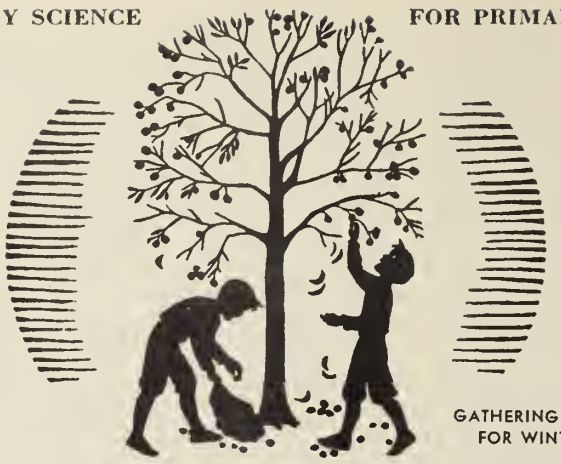
After this, we made stories and recorded them on charts. Each chart was placed near the home of the pet, thus serving as a reading cue. The following stories were developed.

OUR SQUIRREL

Our squirrel is pretty.
He has a long bushy tail.
He has sharp teeth.

(*Turn to page* 59)

WILD ANIMALS



GATHERING NUTS FOR WINTER

PREPARING FOR WINTER

ANNA F. DEANE
State Teachers College, Westfield, Mass.

IN TEACHING this unit of preparation for winter, the objective was to help children to see that man is not alone in making such preparations, that all living things have certain winter habits. To make this concrete to pupils of primary grade level, the unit was divided into four parts.

PART I

How Animals Get Ready for Winter

Specific objectives for this part of the unit were:
To show children what happens to—

1. animals they have been seeing all summer (squirrels, chipmunks, woodchucks, dogs and kittens)
2. animals they have been reading about (bears, rabbits, raccoons, etc.)

Charts were prepared by cutting and mounting pictures taken from the book "Forest Friends," a picture book by Fern Peat bought in the ten-cent store. Under each picture, the teacher printed a short story which the children could read, as follows:

Picture of a rabbit—"Some rabbits become white."
Picture of a raccoon—"Mr. Raccoon grows very fat."
Picture of a chipmunk—"Chippy saves his food. He also takes naps."
Picture of a squirrel—"Mr. Squirrel stores food for winter."
Picture of kittens—"Our pet kittens get warmer coats."
Picture of a bear—"Bears grow very fat. They have long naps."
Picture of a skunk—"Skunks take naps too. Their naps are not very long."
Picture of a woodchuck—"Mr. Woodchuck has a long nap."
Picture of a muskrat—"Jerry Muskrat stays in his home all winter."

A large printed chart was made and placed in the middle of the bulletin board. This was a concise wording of the subject:

Getting Ready for Winter

Some animals go to sleep.
Some animals store food for the winter.
Some animals become very fat.
Some animals build winter homes.
Some animals become white like the snow.

The lesson was introduced by a discussion of how people get ready for winter. The children were then asked if they knew of anything else that gets ready. Several answers were given, among them "squirrels." The class talked about squirrels, and the teacher showed the squirrel picture and explained what the story meant. In this way each animal was discussed. The large chart came last as a review and summary. This chart was read by one child. Then the whole display was mounted in the "Nature Corner."

During the discussion, one boy suggested grasshoppers and crickets are getting ready for winter. We saved discussion of these little animals for the next lesson. So the way was paved for part 2 of the unit.

The following references are helpful in planning what information to give about the pictures:

"Out of Doors"—Craig and Baldwin, pages 53-69
"Science Stories Book II"—Scott Foresman, pages 62-64
"My Nature Book"—May T. Watts
"The Wonderworld of Science"—Knox, pages 47-55
"Bear Cubs and Their Mother"—Charlotte Barske-Artists and Writers Guild. (A ten-cent store book. Excellent.)
"Wild Animals of North America"—John Holgworth. (Ten cents.)
"Furry Ones"—Robin Palmer. (Ten cents. Excellent. Large photographs.)

PART II

How Insects (or Little Animals) Get Ready for Winter

Here the objective was similar to the previous one—to find out what had become of the grasshoppers and crickets we had been seeing. Additional charts were made using the colored pictures from the ten cent store book "Bugs." These were mounted with stories under them as follows:

Caterpillar picture—"The caterpillar makes a cocoon and sleeps."
Cricket picture—"Crickets lay eggs and die."
Grasshopper picture—"Grasshoppers lay eggs then die."
Beetle picture—"The beetle sleeps in the ground."

The class re- *(Turn to page 59)*

Animal Life
WORK SHEETS

BY FRANCES CRAHAN

FOR PRIMARY GRADES

DISPLAY *pictures or give the class a page of hectographed drawings of sheep, cow, calf, pig, raccoon, wolf, rabbit, deer, bison, skunk, muskrat, horse and bear. Number each picture or drawing. Write the numbers of the pictures that answer the following questions. You may have to use some numbers more than once. (The sentences may be hectographed for each child.)*

1. From which animal do we get material for our snow suits?
2. From which animal do we get veal?
3. Which animal hibernates in winter?
4. From which animal do we get pork?
5. From which animals do we get the fur for our fur coats?
6. From which animal would you get the material for your woolen sweater?
7. The fur of which animals are used to trim our coats?
8. Which animals are protected by law?
9. Which animals live in holes?
10. Which animals did the Indians use for food and for their clothing?
11. Which animals eat other animals?
12. From which animals do we get butter?
13. From which animal do we get leather for shoes?
14. Which animal washes his food before eating it?
15. From which animal do we get lard?
16. Which animals are not used for food?
17. From which animals do we get glue?
18. From which animal do we get bristles for our brushes?
19. From which animal do we get T-bone steak?
20. From which animal do we get bacon?
21. From which animal do we get material for our footballs?
22. The baby of which animal is called a fawn?
23. Cheese is made from the milk of which animal?
24. The meat for your hamburgers come from which animal?

KEY

1. sheep
2. calf
3. bear, skunk
4. pig
5. muskrat, raccoon, bear, deer, sheep
6. sheep
7. muskrat, raccoon, bear, wolf
8. raccoon, bear, deer, bison, muskrat
9. skunk, muskrat, bear, wolf
10. deer, bison
11. wolf, bear
12. cow
13. cow, horse, deer
14. raccoon
15. pig
16. wolf, muskrat, bear
17. cow, horse
18. pig
19. cow
20. pig
21. pig
22. deer
23. cow
24. cow, pig

PICTURES *or drawings of pig, cow, calf, sheep, lamb, and deer numbered and displayed as in the first work sheet. Ask children to write the numbers of the picture that answer question, as before. If you had one of these meats for dinner from which animal would you get each meat?*

1. T-bone steak
2. spareribs
3. hamburger
4. bacon
5. beef roast
6. ham
7. liver
8. pork roast
9. round steak
10. veal chops
11. leg of lamb
12. mutton
13. pork chops
14. pork steak
15. venison steak
16. short ribs of beef
17. pork tenderloin
18. wieners (frankfurters or "hot dogs")

KEY

1. cow
2. pig
3. cow, pig
4. pig
5. cow
6. pig
7. cow, pig, calf
8. pig
9. cow
10. calf
11. lamb
12. sheep
13. pig
14. pig
15. deer
16. cow
17. pig
18. pig, cow

DISPLAY *or distribute pictures or drawings of cultivator, tractor, harrow, manure spreader, combine, potato digger, reaper, drill, hay loader, hay rake, mowing machine, corn binder, and potato digger. Number each one. Ask the children to write the number of the picture that matches the description in the following sentences.*

1. I uproot weeds and loosen the earth.
2. I break up lumps and covers seeds.
3. I put fertilizer on the soil to enrich it.
4. I cut wheat, oats, rye, and barley.
5. I cut and thresh grain at the same time.
6. I take potatoes from the ground.
7. I sow seeds in rows.
8. I cut hay.
9. I help to load hay.
10. I gather the hay into long rows.
11. I am the machine that is most often used.
12. I am not used in spring.
13. I am used in spring.
14. I am used to pull heavy loads.
15. I tie corn stalks into bundles.

KEY

1. cultivator
2. harrow
3. manure spreader
4. reaper-combine
5. combine
6. potato digger
7. drill
8. mowing machine
9. hay loader
10. hay rake
11. tractor
12. combine, reaper, potato digger, corn binder
13. tractor, harrow, drill, mowing machine, manure spreader, cultivator
14. tractor
15. corn binder

GIVE *hectographed copies of these questions to the children to write the answer. It is presumed by this time in the year that the class will have taken up these facts in connection with the farm unit. You may have to help them with the first answer. If preferred, you may take the questions up orally, writing the names of the different babies on the board. In that case, ask the children then to write the name of the baby opposite the question on his paper and draw its picture.*

1. What is a turkey's baby called?
2. A calf is the baby of what animal?
3. What is a cat's baby called?

(*Turn to page 55*)

DORIS E. WRIGHT

GOOD FRIENDS

The Cat and the Dog

A Unit on Two Common Pets

BY MILDRED SOURWINE

For Primary Grades

THE DOG is the child's favorite pet. There is no other animal with which he is so familiar. In many homes he is much loved, having the same privileges as the children. The dog is loved not only by children but by the grown-ups as well. He is known as man's best friend.

The cat has been a household pet as far back as we have any records of civilization. She is not only a beloved playmate but is of great value in checking the ravages of rats and mice. We owe much to the cat for her help.

AIMS

A. To teach a few facts about some common household pets.
B. To stress kindness to animals.
C. To increase child's speaking and reading vocabulary.
D. To give opportunity for self-expression through the spoken word and through handwork.

MEANS OF APPROACH

A. Conversation
B. Observation
C. Pictures
D. Stories
E. Poems

POINTS EMPHASIZED

THE DOG

A. Obvious parts and their uses.
B. Breeds
   1. Shepherd
   2. Collie
   3. Terrier
   4. Hound
   5. Police, etc.
C. Uses
   1. For protection.
   2. For hunting purposes.
   3. Substitute for horse.
   4. A household pet.
D. Characteristics
   1. Courage
   2. Strength
   3. Faithfulness
   4. Love
   5. Endurance
   6. Beauty
   7. Swiftness
   8. Intelligence
   9. Memory
   10. Docility
E. Care
   1. Food
      (a) Kind
      (b) Amount
      (c) Regular Feeding
   2. Cleanliness
   3. Housing
   4. Training
F. Emotional Expression
   1. Delight
   2. Friendliness
   3. Affection
   4. Anger
   5. Fear
   6. Shame
   7. Attention
   8. Excitement

THE CAT

A. Obvious parts and their uses.
B. Kinds
   1. Persian—the long haired.
   2. Common—the short haired.
C. Colors
D. Uses
   1. As a pet.
   2. As a hunter of mice and rats.
E. Characteristics
   1. Intelligent
   2. Teachable
   3. Sensitive
   4. Nervous
   5. Timid
   6. Graceful
   7. Loves attention
   8. Good memory
   9. Cleanly
   10. Has a love for places
F. How does a cat express its emotions?
   1. When hungry
   2. When happy
   3. When friendly
   4. When frightened
   5. When hurt
   6. When defiant
   7. When disobedient
   8. When fighting
G. Care
   1. Food
      (a) Kind
      (b) Amount
      (c) Regular Feeding
   2. Housing
   3. Training
H. Points of Special Interest
   1. Emotional expression of animals.
   2. Comparison of tracks.
   3. Comparison of eyes.
   4. Noting position of nostrils.
   5. Noting differences in ears.

ACTIVITIES

A. Cooperative Stories
B. Storytelling
C. Collecting Pictures
D. Making Booklets
E. Illustrating with Crayons
F. Illustrating with Paper Cutting
G. Making Animals with Cardboard and Oilcloth
H. Modeling with Clay and Plasticine
I. Making Riddles

LAMBERT

to Animals" week. — Editor

VOCABULARY

A. Names of Dogs
Collie, Terrier, Shepherd, St. Bernard, Police

B. Parts of the Body

head	legs	claws
eyes	feet	hair
nose	toes	fur
mouth	tail	whiskers
ears	pads	tongue

C. Action

run	climb	pull
walk	lead	hunt
trot	bark	smell
crawl	whine	growl
jump	watch	mew
lap	purr	

D. Descriptive and for Comparison

soft	keen	tall	stout
rough	good	warm	hot
sharp	thick	short	cold
clean	fresh	long	dull
dry	wet	slender	
light	heavy	bright	

OUTCOMES

A. Enlargement of child's interest and experience.

B. Skills
1. Reading
   (a) Increased reading vocabulary.
   (b) Furnished motive for reading. Children found and read stories to group.
2. Oral English
   (a) Developed power in self-expression.
   (b) Increased speaking vocabulary.
   (c) Memorized poems.
   (d) Appreciation. Choosing stories and poems.
3. Art
   (a) Free illustration of parts of stories.
4. Writing
   (a) Improvement. Each child tried to improve his handwriting so that he might write the sentences in our cooperative book.

MYSLIS

TYPES OF SEATWORK

A. Which Are Right?
1. A cat keeps her kittens clean.
2. Cats wash after they eat.
3. Cats like hot milk.
4. Cats catch rabbits.
5. All cats are white.
6. Some cats have long tails.
7. Some cats have no tails.
8. Cats are good jumpers.

Key

1. yes	3. no	5. no	7. yes
2. yes	4. yes	6. yes	8. yes

B. Completion
1. A cat has sharp ———.
2. A cat has long ———.
3. A cat has soft ———.
4. A cat has a rough ———.
   (a) tongue (c) feet
   (b) whiskers (d) claws

Key

1. d 2. b 3. c 4. a

1. A dog knows his ———.
2. You can teach a dog to do ———.
3. You must give a dog ——— water every day.
4. You must keep his bed ———.
5. You must not give him ——— bones.
6. Give your dog a ——— once a week.
7. Give your dog meat ——— a day.
8. Always be ——— to your pets.
   (a) kind (e) once
   (b) bath (f) chicken
   (c) clean (g) fresh
   (d) tricks (h) master

Key

1. h	3. g	5. f	7. e
2. d	4. c	6. b	8. a

C. Matching Questions and Answers
1. What does a cat say when she wants you to open the door for her?
2. What does she do when she is happy?
3. What does she do when she is angry?
4. What does she do when you hurt her?
5. What does she do when you take away her food?
   (a) growls (d) purrs
   (b) mew-mew (e) spits
   (c) squalls

Key

1. b 2. d 3. e 4. c 5. a

D. Multiple Choice
1. A cat has
   (a) soft fur
   (b) rough fur
   (c) hard fur
2. A cat walks
   (a) on its tail
   (b) on its ears
   (c) on its toes
3. A cat hunts
   (a) at noon
   (b) at night
   (c) in the morning
4. A cat catches
   (a) bears
   (b) rats
   (c) birds
   (d) foxes
   (e) rabbits
5. When walking, a cat makes
   (a) four tracks
   (b) two tracks
6. A cat should have
   (a) cold milk
   (b) hot milk
   (c) warm milk
7. A baby kitten has
   (a) blue eyes
   (b) yellow eyes
   (c) green eyes
8. A cat has
   (a) no whiskers
   (b) short whiskers
   (c) long whiskers

Key

1. a	3. b	5. b	7. a
2. c	4. b, c, e	6. c	8. c

1. Which does a dog watch?
   (a) sheep
   (b) squirrels
   (c) sleep
2. How many toes are on a dog's front foot?
   (a) four
   (b) two
   (c) five
3. What are baby dogs called?
   (a) ponies
   (b) puppies
   (c) supper
4. Which do dogs hunt for?
   (a) lost people
   (b) lost airplanes
5. Where is a good place for a dog to sleep in summer?
   (a) in the house
   (b) in the yard
6. How does a dog keep his teeth clean?
   (a) with water
   (b) with bones
   (c) with bread
7. How does a dog help blind people?
   (a) he leads them
   (b) he feeds them
8. How do you know when a dog is well?
   (a) by his bright eyes
   (b) by his dull eyes
   (c) by his wet nose
   (d) by his dry nose
   (e) by his cold nose
   (f) by his warm nose

Key

1. a	5. b
2. c	6. b
3. b	7. a
4. a	8. a, c, e

E. Following Directions
1. Put a green X on my eye.
2. Put a brown X on my tail.
3. Put a blue X on my paws.
4. Put a purple X on my ears.
5. Put a red X on my whiskers.
6. Put a yellow X on my neck.
7. Put a black X on my tracks.

(Turn to page 57)

AUTOGRAPHS OF MINK AND REDPOLL

THE RED FOX'S TRAIL

SIGNS OF WILD LIFE IN WINTER

MATERIAL FOR LESSONS IN ELEMENTARY SCIENCE

EDMUND J. SAWYER

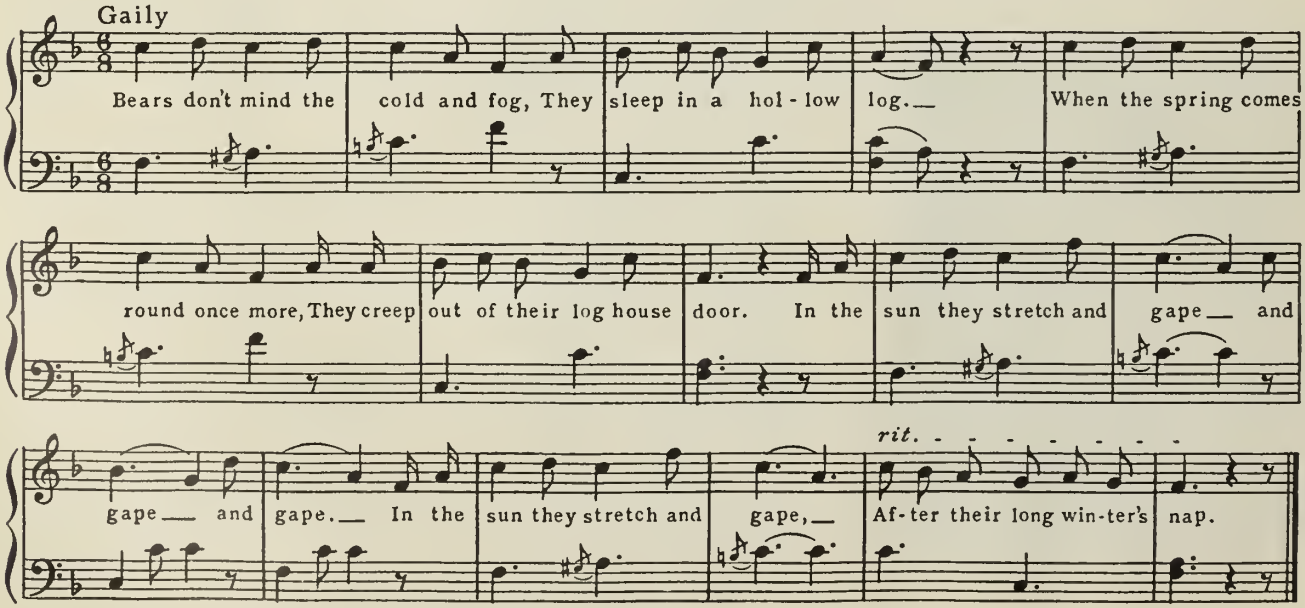
BIRDS and four-footed animals are few in winter and rather seldom seen, for it is not easy to wade through the deep snow in the woods and fields for chance glimpses of crossbills, owls, redpolls, and snow-buntings. The fur bearers make quick forays after food and water and soon return to their snug burrows or hollow trees. We are lucky if we see on our winter walk anything but a few squirrels and rabbits. However, there are many stories written on the snow in varied and interesting characters. Not even a tiny field mouse can take one timid step from his hole without leaving a record for sharp eyes to read. The snow, which shuts the animals themselves away from us, is after all an advantage. Animals of which we learn little in summer, because they are scarce or roam abroad chiefly at night now, by their trails in the snow, tell us about their wanderings; how and where they got food; where they went for water; and whether they ran, trotted, walked, or ambled, is there written down. The squirrel, raccoon, fox, mink, muskrat, skunk, rabbit, and many birds will have been abroad.

STREAMS AND PONDS

Certain kinds of places are particularly favored by wild creatures in winter. A swift stream, or any piece of open water, is always sure to attract many of the winter wide-awakes and these are the best places in which to look for various snow trails, especially those of mink and muskrat. Near bushy or weedy growths along old fences, beside low thickets, or in dry, sedgy marshes, you will find that mice have been most numerous and active, their trails crossing and recrossing in some places quite like the

A LONG NAP

PEARL ASTRID NELSON — RUTH WESTMAN


Gaily
Bears don't mind the cold and fog, They sleep in a hol - low log.
When the spring comes
round once more, They creep out of their log house door. In the sun they stretch and gape and
gape and gape. In the sun they stretch and gape,
rit.
Af - ter their long win-ter's nap.

railroad tracks at a busy junction or a large freight terminal.

These, too, are naturally good places at which to look for signs of foxes and of big, snowy owls. Where one of these creatures has sat in wait for the mice or pounced upon one of the poor fellows, there will be curious marks to study. The fox, however, is a great traveler and, once you are in the open or wooded country, you should be constantly on the lookout for his trail although, unless foxes are more than usually numerous in your locality, one or two fresh trails in a walk in the woods are all that you will be likely to see.

WEEDY FIELDS

A weedy field is perhaps the second best place for wild trails, mostly bird tracks. Fields of goldenrod, "stick-tights" of various sorts, mullen, and other heady weeds, in the shelter of a wood, with perhaps clumps of black haw and wild plum—these are the places for winged winter gleaners. A search of such localities will hardly fail to show where "snowflakes", tree sparrows, horned larks, redpolls, and perhaps goldfinches have been at work. About especially seedy stalks, of the right kinds, the little trails are often clustered and confused, reminding one of the mice tracks in the swamp, but much more thickly grouped than mouse tracks are ever found to be.

I have watched the lively birds making just such trails on a frosty day. How they did flutter and flit about one weed stalk, one of the flock trying to keep all the rest away and, at the same time, feed from the weed by tiptoeing or flying up to reach the higher seeds!

WOODS AND THICKETS

Woods and thickets of any sort may show tracks of the ruffed grouse. At this season, however, these are more often found in an alder swamp or low-lying alder thicket. Here the shy grouse love to go to feed on the buds and catkins of alders and other trees usually found in such places. I have found their trails very numerous for weeks together about fresh brush piles where woodmen have been at work. To me, the trail of this bird is always the most interesting of all. Here and there are places where the grouse has rested a while in the snow and left the imprint of his breast and tail. This is also the time to find the snow caves where these birds spend the cold nights when the snow is deep.

THE TRAIL OF THE RACCOON

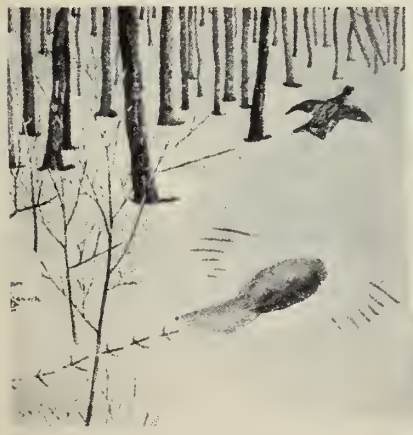
COTTONTAIL TRACKS

Coming to the big woods we find the tracks of red squirrels and rabbits most abundant. Here, too, we may look for the more rare trails of gray squirrels, skunks, and raccoons. A woodcutter once told me of felling a hollow tree in which, to his great surprise, he found half a dozen or more 'coons. This lazy animal seldom, if ever, stirs abroad in bright daylight but, at night, he unrolls himself and crawls clumsily down from the hollow tree in which he spends a great part of his life. His tracks are indeed interesting and, if possible, they should be followed. Can you tell a 'coon's trail from that of a skunk? Here is something to learn in the winter woods.

The skunk is a born ambler. His trail will be found going this way and that, as he looked for food; now and then he has stopped to root down to the ground. The other day, I met a little skunk going about rooting with much energy in the muck of the wood. Undisturbed, he allowed me to follow him about until I came within a few yards. Then he would face about and try to scare me by making little runs in my direction, and scraping backward with his front feet, a very peculiar way that skunks have.

WINTER SHELTERS

Although the birds seem merry and lively and the red squirrel frisks across the snow, the wild creatures really have little love for frost and bleakness. The squirrels are out for food and, when not hunched up gnawing a butternut, or a frozen apple, or looking for something to gnaw, they will be found curl- *(Turn to page 63)*



RUFFED GROUSE

RED SQUIRREL

BOB-WHITE IN SHELTER

AUSTRALIAN ANIMALS

CURIOUS ANIMALS OF THE LAND DOWN UNDER

FOR PRIMARY AND INTERMEDIATE GRADES

THE KANGAROO

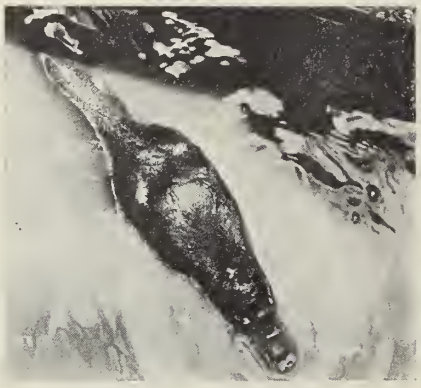
Along with the emu, the kangaroo is incorporated in the Australian coat of arms. The largest of these animals are the red and gray species. Some have been known to clear thirty feet in one leap. The animals are exclusively vegetarian. They are harmless and may be tamed.

THE KOALA

The Koala, or Teddy Bear, is a quaint creature, easily tamed and perfectly harmless. It is extremely slow in movement and lives entirely in trees. It feeds exclusively on certain species of eucalyptus trees.

A PRICE ON HIS HEAD!

The Australian Dingo, or Wild Dog, roams the land in large numbers. These dogs are killers of sheep and the government pays bounties of up to $2.00 for each scalp brought in by a hunter.



NO SUCH ANIMAL!

When the first stuffed platypus was sent to the scientists of the British Museum, they laughed and remarked, "There ain't no such animal!" The platypus is a combination of animal, bird, fish and reptile. It has short fur, beaver-like tail, webbed feet, duck's bill and rooster's spur. It is at ease in the water or on the land. It lays eggs.

FEATHERS, BUT NO FLIGHT

The Emu is Australia's national bird. It can neither fly nor fight. Its brownish-black feathers, although attractive, have no commercial value. The female lays up to 18 eggs, of 16 to 18 ounces in weight. They have no song, but make a deep, drumming sound. Like the ostrich, the emu can run at remarkable speed when pursued.

ALL PICTURES ABOVE, AUSTRALIAN INFORMATION BUREAU

THE ECHIDNA

The Echidna is one of three representatives of the most primitive mammals on earth. The echidna is about 18 inches long. Its back and sides are covered with strong, pointed spines. It captures its food, consisting mainly of ants, by means of its long tongue.

CANADIAN PACIFIC RAILWAYS

LYRE BIRD

The lyre bird is one of Australia's peculiar birds, so called because its tail is shaped like a lyre. It is the largest of all song birds and imitates the songs of other birds and the sounds of animals.

FOR PRIMARY GRADES

The Rabbit Unit

With special reference to alphabet usage

Jean Currens

Your pupils will be delighted with the part the Easter Bunny plays in this unit.—The Editor

Arrange these animal names in alphabetical order.

rabbit	turtle	chipmunk
ape	kangaroo	quail
muskrat	frog	horse
zebra	squirrel	goat
beaver	jaguar	hippopotamus
ox	pony	unicorn
yak	deer	dog
mouse	wren	man
elephant	lion	woodchuck

Check with your dictionary to see if you have arranged them properly.

What is a rodent? (Animals that gnaw, such as rats, mice, squirrels, hares and rabbits.)

Choose just the rodents from your list of animal names, and arrange them alphabetically.

After each rodent's name, write a brief description of each animal.

By class choice, or by some other method, select one of these animals for further study.

Let the group compile a list of questions about the particular animal that is their choice, either individually or as a group. (My class chose the rabbit.)

Study of Rabbit

1. See pet rabbit and observe it. (a) Hopping. (b) Making its toilet. (c) Eating.

2. Look at pictures in books and read captions.

3. Read stories.

4. Look up answers to questions that have not been cleared up.

(a) Rabbits' long legs are helpful to them. They have strong, hind legs to aid them in escaping their enemies. They are able to jump as high as eight feet at one time while hurrying from fox, mink, weasels, hawks, owls, snakes, or man. As they run they place their hind feet on each side and ahead of their front feet. Their five front toes and four hind toes do not make a distinct track, for they are hair covered. This hair also protects their feet from the cold while they are sitting in the snow.

(b) Rabbits' long ears are helpful. Rabbits' ears are not just ornamental. They are quick to detect danger and are usually on guard. When the long ears stand up very tall, they are keenly studying a particular sound. If one ear is forward and one points backward, the rabbit is trying to locate the danger. Rabbits' ears are not black tipped as are those of the hare.

(c) Rabbits' colors are helpful too. Cottontails' colors are white underneath and brown topped to match the snow and gray brown of the dead grasses and weed stubs. Therefore, unless rabbits move, they are difficult to detect. The snow-shoe rabbits have protective coloring, too. In summer, they are reddish brown. In autumn, they are white.

(d) Rabbits are vegetarians. Rabbits' foods are such plants as the coarse blades of cabbage, turnip leaves, celery, carrot tops, chick-weed, sow thistle, dandelions, clover, blue grass, parsley, and grains. Another delicacy in the rabbit's diet is bark. In winter when most plants are frozen or snow covered, the rabbit makes himself unpopular with farmers by chewing the bark of young fruit trees and berry bushes.

(e) Rabbits have many kinds of homes. The cottontail rabbit's home may be very simple. It may be covered only by growing weeds and just wide enough to allow them to enter. When the family is born, the nest will be a very shallow excavation lined with the female's own hair. In winter, the rabbit's home may be a vacated woodchuck or skunk burrow called a warren.

(f) Man makes use of rabbits. Rabbit meat and fur have long been used by man. Rabbit skins are now carefully dyed to represent ermine and chinchilla. Rabbit hair is used in the making of many felt hats. After the hair has been removed, the hides are sold to glue and sizing manufacturers.

(g) There are many kinds of rabbits such as the Belgian hare, lop-eared rabbit, Dutch rabbit, Angora rabbit, Siberian, Himalayan, Patagonian, and Flemish rabbits, the fancy silvertip rabbit, and the delicate Pole rabbit. The jack rabbit is really a hare, not a rabbit.

(h) Easter, the rabbit's busy day. The rabbit furnishes part of the Easter legend, as follows: Bunny's gifts on this occasion are bright colored and beautifully decorated eggs. Rabbits leave their eggs in houses, behind furniture, in specially decorated baskets and boxes, and other obscure places. On Easter morning children hunt baby chicks, eggs, and candy rabbits. Also bunny's picture is painted with the Easter eggs on Easter cards. Bunny's Easter eggs are supposed to symbolize the new birth of springtide.

5. Discuss findings.

6. Check on alphabet work. *(a)* List enemies of the rabbit alphabetically. *(b)* List rabbits' favorite foods alphabetically. *(c)* List kinds of rabbits alphabetically.

7. Let each child pretend to be a rabbit and tell of his own experiences.

(a) A Narrow Escape
(b) One of My Experiences
(c) Getting Food
(d) Danger One Warm Winter Day
(e) My New Mate
(f) Training My Family
(g) How I Protect Myself
(h) Easter, My Important Day
(i) Why My Ears Are So Long
(j) I'm In A Glue Bottle
(k) Sewed to A Coat
(l) How A Hunter Almost Got Me
(m) When I'm At Home
(n) My Relatives

RABBITS—WILD AND TAME

A UNIT OF STUDY APPROPRIATE FOR EASTER*

ELLA BACON

•

FOR PRIMARY GRADES

I. OBJECTIVE

A. To gain knowledge of the value of rabbits to man.
B. To increase the love for rabbits as pets.

II. AIMS

A. Teacher's aims.
   1. To teach the pupils to read.
   2. To teach them to search for suitable materials.
   3. To give them an opportunity to use different forms of composition.
   4. To teach them to protect rabbits, and to appreciate nature.
B. Pupils' aim.
   1. To find out what they can about rabbits.

III. MATERIALS

A. Pictures.
   1. Of rabbit life.
   2. Of rabbits by famous artists.
B. Stories.
C. Easy Poems.

IV. PREPARATION

A. Ask such questions as:
   1. Where was the original home of the rabbit?
   2. Do you know the name of a wild rabbit and a tame rabbit?
   3. Do wild rabbits store food for winter?
   4. Do wild rabbits carry food to their burrows?
   5. What do you think they find to eat?
B. Read to the pupils interesting poems and stories.
C. Show them pictures of rabbits.
D. Let one of the pupils bring a pet rabbit to school. Have him tell how he takes care of his rabbit.

J. JAY HIRZ

BUNNY AT HOME

V. PRESENTATION OF PROBLEM—

A. Structure of rabbit.
   1. Body.
   2. Ears.
   3. Eyes.
   4. Nose.
   5. Mouth.
   6. Legs.
   7. Feet.
B. Homes.
   1. In the briar patch.
   2. Under the root of a tree.
   3. In the hay field.
   4. In a hollow tree or log.
   5. In a hutch.
   6. In a sandy bank.
C. Food and feeding.
   1. Dry foods—hay and grain.
   2. Green foods—garden vegetables, weeds, grass, and clover.
   3. Water—fresh all the time.
   4. Salt—piece of rock salt kept in the hutch.
   5. No wet or stale food.
   6. Time for feeding—twice a day.
D. Habits to observe.
   1. Position of legs, body, ears, and eyes when sleeping, lying down, sitting up, listening, frightened, or hungry.
   2. Fighting.
      a. Manner of indicating anger: thumping.
      b. Manner of fighting: biting and kicking.
   3. Mother rabbit and her babies.
      a. Carries her babies as a mother cat does her kittens.
      b. Rabbits never should be carried by their ears.
      c. Baby rabbits are born blind and helpless.
      d. Baby rabbits taken away from their mother after two months.
   4. Movements.
      a. Walking, hopping, jumping.
      b. Digging.
      c. Tracks (recognition of tracks).
   5. Personal cleanliness.
      a. Washing, with tongue.
      b. Brushing, with foot.
   6. Sounds.
      a. Extreme fright—loud shriek.
      b. Terror or pain—long-drawn shriek.
      c. Thumping of foot in anger, warning, and mating.
E. Enemies.
   1. Bird enemies—hawks and owls.
   2. Mammal enemies — coyotes, dogs, and cats.
   3. Human enemies—traps, poison,

*This unit was worked out in the public schools of Escanaba, Michigan.

J. JAY HIRZ

WHITE ANGORA

H. ARMSTRONG ROBERTS

WHITE NEW ZEALAND

KEYSTONE

GRAY ANGORA

UNDERWOOD & UNDERWOOD

SPECIALLY BRED LONG EARED RABBITS

hunters, automobiles, and bad boys.
4. Miscellaneous enemies—snakes.
5. Protection from enemies.
   a. Protective coloration.
   b. Freezing, sitting still.
   c. Telegraphing.
   d. Tricks—hiding, dodging.
   e. Fighting.

VI. VALUE TO MAN

A. Pets.
B. Food.
C. Fur.

VII. DAMAGE CAUSED BY RABBITS

A. To bark of young trees by gnawing.
B. To crops in garden, vineyards, and hay fields.

VIII. ACTIVITIES AND TESTS

A. Language.
   1. Oral.
      a. Questions and answers.
      b. Informational sentences about rabbits using the new vocabulary.
      c. Reciting selected poems about rabbits.
B. Reading.
   1. Read stories relating to rabbits.
   2. Ability to use intelligently and correctly the words on the vocabulary chart.
   3. Seatwork based on class discussions.
   4. Blackboard reading about rabbits.
C. Spelling.
   1. Words relating to rabbits, as hutch, nest, thumping, wild, tame.

D. New vocabulary.

rabbits	foxes
briar patch	value
root	flesh
runways	hutch
grains	nest
weeds	hollow
fresh	dry
hind	vegetables
tracks	clover
fighter	legs
tail	front
sensitive	dodger
three-cornered	ground
forwards	ears
brushes	mouth
dogs	sharp
weasels	tongue
danger	enemies
food	traps
tame	snakes
wild	man
tree	skin
buck	hole
green	safe
grass	hay field
salt	hay
strong	garden
jumper	water
thumps	long
cotton	weak
twinkles	digger
eyes	telegraphs
washes	nose
foot	motion
boys	backwards
fur	freezes
hunters	pets
poison	glue

E. Art.
   1. Draw pictures of rabbits.
   2. Cut rabbits freehand.
   3. Directed lessons.
   4. Booklet on rabbits.

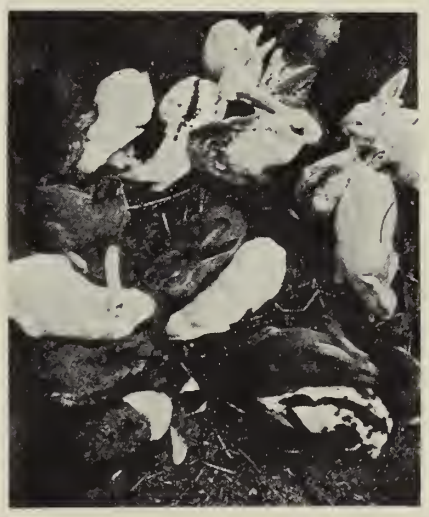
F. Types of seatwork.
   1. Blank filling.
      1. The cottontails are ..... rabbits.
      2. Cottontails get their name from their .....
      3. Cottontails have brown fur in .....
      4. They have gray fur in .....
      5. They have very long .....
      6. Their ..... legs are strong.
      7. Their hind legs keep them out of .....
      8. They have ..... on their feet.

1. summer	5. winter
2. cushions	6. ears
3. hind	7. tail
4. danger	8. wild

   2. Multiple Choice
      1. A cottontail rabbit is
         a. tame b. red c. wild
      2. He gets his name from his
         a. ears b. tail c. noise
      3. In summer his fur is
         a. red b. black c. brown
      4. He likes to eat
         a. clover b. nuts c. corn
      5. He is sometimes called a
         a. dodger b. cat c. dog
      6. His home is called a
         a. farm b. house c. den
      7. He wash- *(Turn to page 60)*

UNDERWOOD & UNDERWOOD

FLEMISH GIANT



KEYSTONE

VARIOUS BREEDS

UNDERWOOD & UNDERWOOD

CHINCHILLAS

The Squirrel

I stood this morning at my kitchen door
And watched a squirrel beneath our hickory trees.
His bushy tail went scurrying in the breeze
As nuts he found and buried by the score.
Indeed, he must have hid two winters' store!

What inspirations from such scenes accrue!
Briskly he worked with eye, and leg, and tail.
In this, his biggest job, he would not fail.
Some men have never learned what this squirrel knew:
Successful living calls for work to do.

—LELAND B. JACOBS

THE SQUIRREL UNIT

MATERIAL FOR A REQUIRED ACTIVITY

MARGARET FITZSIMMONS

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FOR PRIMARY GRADES

I. OBJECTIVE

a. To learn about squirrels and their habits.

II. POINTS DEVELOPED IN THE STUDY

a. Squirrel Family
   1. Squirrels
   2. Flying squirrels
   3. Ground squirrels
   4. Chipmunks
   5. Prairie dogs

b. Classes
   1. Tree squirrels
   2. Ground squirrels
   3. Flying squirrels

c. Description
   1. Short and strong legs
   2. Bushy tail for balancing
   3. Sharp, long front teeth
   4. Sharp claws

d. Homes
   1. Winter homes
      a. In the hollows of maple, birch, beech, oak, and pine.
      b. Among the roots of trees.
   2. Summer homes
      a. Nests constructed of twigs and leaves and located on high branches.
      b. Nests made in apple trees and located nearer to the ground.

e. Food
   1. Nuts
   2. Grain
   3. Apple seeds
   4. Berries
   5. Worms
   6. Pine seeds

PICTURES FROM "THE CHISEL-TOOTH TRIBE" BY WILFRED S. BRONSON: COURTESY HARCOURT, BRACE & CO.

III. VOCABULARY

ground	bushy	haunches
tree	tails	hollow
slender	acorns	store
long	food	body
lives	noisy	chatter
cones	nest	snug
leaves	lined	claws
shelter	trunks	parks
family	hair	color
curious	berries	enemy
flying	graceful	tame
spread	frisky	

IV. MATERIALS

a. Pictures of squirrels from magazines and newspapers.
b. Stories.
c. Poems.

V. OUTCOMES

a. Language.
   1. Simple informational sentences.
   2. Riddles.

b. Reading.
   1. Supplementary readers.
   2. Library books.
   3. Charts.
   4. Seatwork.

c. Art.
   1. Paper cutting—borders.
   2. Easel work.
   3. Crayon illustrations.

VI. SEATWORK

a. True and False Statements.
   1. Squirrels are about 20 inches long.
   2. Squirrels line their nests.
   3. The squirrel is an animal that is not often heard.
   4. The squirrel is very lazy.
   5. Squirrels have but one nest.
   6. The squirrel stores food away in hidden places.
   7. The squirrel steals sap from the trees.
   8. Squirrels are the same color all the year.
   9. Squirrels like to chatter.

b. Blank filling.
   1. Red squirrel hides nuts under .....
   2. He likes to drink .....
   3. He has ..... homes.
   4. He likes to .....
   5. He has ..... teeth.
   6. His tail keeps him .....
   7. He likes to eat ..... seeds.
   8. Red squirrel is .....
   9. He can ..... nuts.

a. four	f. sharp
b. warm	g. open
c. playful	h. sap
d. pine	i. chatter
e. trees	j. two

c. Classification.

Put the numbers of the sentences in the correct column. *(Turn to page 56)*

HOW ANIMALS KEEP CLEAN

A CORRELATION OF NATURE STUDY AND HEALTH

H. B. BRADFORD

THE EASTER season when, with the approach of spring, the children are especially interested in birds and animals is a good time to impress upon them the importance of cleanliness in the care of pets. All students of child life consider it advisable for every child to own a pet and to be held responsible for its care. And one of the best ways to motivate the study of health in relation to the child's own welfare is through the study of how animals keep themselves clean. This study will impress upon children not only that they should take proper care of the pets themselves, but also that they should keep the homes which are provided for their pets neat and attractive.

Those who have seen how dirty some farmers' pigs and other animals usually appear may think that uncleanliness is the usual condition of most animals but this is not the case. The mud bath of the buffalo, for example, is a cleansing process. The buffalo's wallow serves as a sort of scrubbing hole. The mud soon dries into cakes upon the animal's hide and either falls or is rubbed off, taking with it loose hair and much other irritating matter. When pigs are allowed to graze and root in a large field, they are cleanly animals. Young pigs are always clean unless they are kept in a dirty pen.

EDITOR'S NOTE: The accompanying illustrations show a wasp cleaning an antenna by its mouth "jaws"; a kangaroo, a cat, and a mouse washing their faces; a fly cleaning its wings with its hind legs; and a group of chickens, two oxen, and three rabbits at their toilets, in the order named.

•

The uncleanly condition of certain domestic animals, such as horses and cows, is the result of their owner's carelessness. The cows of a careless farmer are likely to be dirty unless the local Board of Health or milk inspector takes charge. A good farmer keeps the coats of his cows as clean and smooth as he keeps those of his horses. All horses like to roll on the earth in some dry, bare spot, because it enables them to scrub their back and shoulders which they cannot reach in any other way. The tongues of cattle are very rough and are often used to smooth their own coats and those of their offspring. They often help each other in tidying up and proffer their services to others of their own kind. If you rub any animal the wrong way you will notice how quickly he will try to smooth himself.

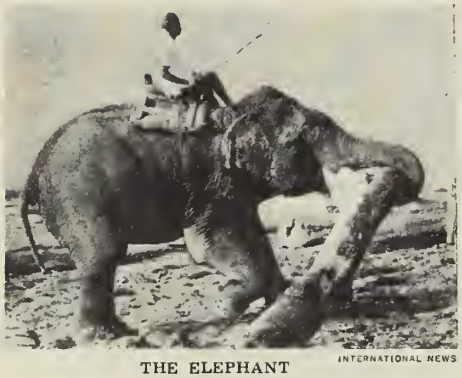
The members of the cat tribe, including lions and tigers, use their rough tongues as damp brushes for the cleansing and smoothing of their fur. They also wash their faces by licking a foreleg just back of the foot and then rubbing it over the head, especially over the face, now and then extending the process over the ears.

Rats, mice, squirrels, and rabbits use both paws simultaneously over the face, except when they reach up to and over the ears. Then they usually attend to each ear with one paw at a time. Rabbits, (*Turn to page 56*)

THE TIGER TRIANGLE PHOTO

MONKEYS WIDE WORLD

THE LION WIDE WORLD



THE ELEPHANT INTERNATIONAL NEWS

THE CAMEL UNDERWOOD STRATTON

WILD ANIMALS

A SOCIAL SCIENCE UNIT

GERALDINE BUHR, DOROTHY GILBERT

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FOR PRIMARY GRADES

I. OBJECTIVES

1. To give knowledge of several wild animals.
   a. where they live
   b. what they eat
   c. how they protect themselves
   d. their usefulness to man
   e. their outstanding characteristics
2. To give appreciation of wonders of wild life.

II. ACTIVITIES

1. Language
   a. Discussion of animals to gain information about the lion, tiger, elephant, giraffe, camel, monkey, deer, and bear.
   b. Cooperative riddles.
   c. Cooperative stories about the animals.

The Lion

The lion has a heavy mane. He has a strong tail. He can knock a man down with his tail. The lion puts his head to the ground and roars. He must be eighteen months old before he can roar. He kills only when he is hungry.

The lion lives in the jungle. He is called "King of the Beasts". A mother lion is called a lioness.

The Giraffe

The giraffe is the tallest animal. He has a long neck. He has brown spots. He has a long tongue. It is covered with gum to keep from getting sunburned. He has long hair on his lips so thorns won't prick him. He is a lonely animal. He would die if left alone. Giraffes do not make any noise.

The Elephant

The elephant is the largest animal. He has a long trunk. He can carry big logs with his trunk. He can pick up peanuts, too. He has ivory tusks. He can swim and walk under water.

The elephant's skin is gray and very tough.

Elephants can do tricks.

The Tiger

The tiger belongs to the cat family. A tiger is orange and black. He looks like sunshine and shadows. A tiger is wicked. He kills other animals for fun. He has very sharp teeth. A tiger lives in the depth of the jungle.

The Bear

Bears live in the forest. They eat berries, leaves, and honey. They sleep all winter in a cave. Bears have strong claws. They can climb trees. They can walk on two or four feet. They are quick to learn to do tricks.

Camels

A camel lives in the desert. Some camels have two humps on their backs. Some camels have one hump. He has long eyebrows to keep off the sun. His feet have pads under them. He eats leaves and bushes. He can go many days without food and water. He stores fat in his hump. He has two stomachs. One holds water. Camels work like horses.

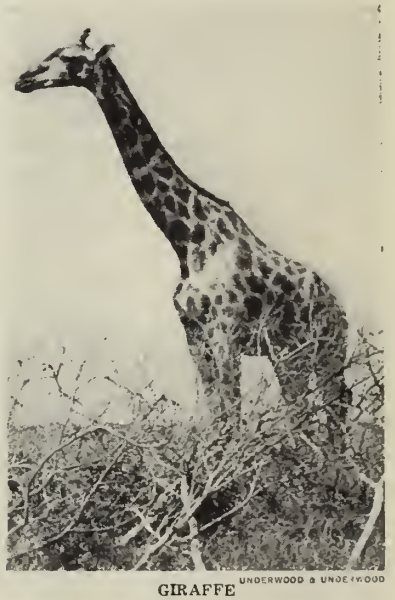
The Monkey

A monkey has a very long tail. He has hands and feet like people. He is playful. He is easy to train to do tricks. He can hang by his tail. A monkey lives in the trees. A monkey eats cocoanuts and fruit.

2. Reading.
   a. New vocabulary

heavy mane ivory tusks
sharp teeth

(Turn to page 61)



GIRAFFE UNDERWOOD & UNDERWOOD

Tallest animal in the world.

SQUIRRELS

MATERIAL FOR A SQUIRREL UNIT OR THE NATURE STUDY CLASS

GERTRUDE MOORE

THE RED SQUIRREL

The red squirrel is as much a part of the October landscape as are dropping nuts, and red and yellow leaves. His gay little chatter belongs to autumn woods quite as much as the bobolink's song does to June meadows.

See the little red squirrel in the picture? He fairly bubbles over with fun. He is as full of pranks as a hand organ is of tunes. His home is the great green wood. The fences and stone walls are his highways. On them he travels to orchards when apples are ripe. Only occasionally, when times are hard, does he venture to some barn and help himself to the farmer's grain.

Many times on his journeys he stops for lunch. He sits up straight and fits his long bushy tail into the graceful curve of his back. Between his paws he holds a ripe hickory nut. He turns it from side to side and crunches into it with his sharp white teeth. He munches daintily. All the time his big, bright eyes watch, his keen ears listen. He is one quiver of excitement from the tip of his ears to the end of his tail. A sound—he is off and away, a streak of rusty red against the gray of the fence rail.

If he finds that he need not have been frightened, he stops again, pulls himself together with many a quick jerk and turn, and goes on with his meal. He cocks his pretty head, now on one side, now on the other. If he sees you peering at him, he looks you all over. When he finds that you do not intend to harm him, he screams and laughs and chatters. So saucy is he that you are quite sure he is saying, "Oh, what a silly thing it is to be a little boy. It's so much more fun

UNDERWOOD & UNDERWOOD

CHIPMUNK

to be a squirrel and be free like me!"

He is such a happy-go-lucky sort of fellow that he doesn't bother much to lay up food for the winter. Sometimes, he stores a few extra nuts here and there, in case he should need them, in the forked branches of trees, or hides them away in saplings. This isn't such a poor plan in some ways, either. For with his food thus scattered about, the red squirrel can go away from home, quite sure that no thief can rifle all his stores. He is more or less active all winter.

When freezing days come, the little red squirrel may know some hungry minutes, but he scurries about over the snow, sure that he will find something to eat. Perhaps there are a few frozen apples left in the orchard. The seeds of these will do for breakfast. Sometimes he dines scantily on sumach buds, or on the seeds he finds hidden away in hemlock cones.

THE CHIPMUNK

Another lively little squirrel is the chipmunk. He is lighter in color than the red squirrel, his tail is shorter and smaller, and he has long, narrow, black stripes on each side of his body.

If you could examine his mouth, you would find a tiny flap of skin on the inside of each cheek. These open inside and make very handy little pockets. Thanks to these pockets, he doesn't need to carry his food in his teeth, as other squirrels do.

The chipmunk lives in a hole which he digs in the ground. It would seem that the little fellow would leave somewhere nearby the loose soil which he digs out, but usually there isn't a trace of it to be seen after the snug little nest is finished. Only the little builder himself knows where he conceals it.

For food he likes a maple leaf quite as well as anything. He picks out a good-sized one, and with both hands tucks it into those handy little pockets of his. Then away he goes by the most roundabout paths to his home.

Close to his home he stores a tidy pile of nuts, enough to last him all winter. In December, he goes into his den. There he stays, warm and cozy, all winter long. He always lives by himself. He does not usually come out of his nest until March. Then he is up and stirring. Who could sleep under the ground when woodpeckers drum and frogs chirp that spring has come?

March is mating time for chipmunks. In May, four or five babies are born to the proud (*Turn to page* 58)

COURTESY AMERICAN MUSEUM OF NATURAL HISTORY

RED SQUIRREL

FLYING SQUIRREL

GRAY SQUIRREL

TURNING WHITE

A LESSON IN WINTER NATURE STUDY

GEORGE KING

With the first snowfall, all nature turns white. Even the air is "whited," as Emerson has said:

The whited air
Hides hills and woods, the river, and the heaven,
And veils the farm-house at the garden's end.

Many plants act their part in this transformation, for the change is not limited to the world of frost crystals. Long ago, the goldenrod turned brown, but now it has become white and stands out clear and bright against the weatherbeaten fence or the grayish blackness of the stone wall. The hawkweeds, too, have passed from yellow to brown and then to a wintry whiteness. The fluffy thistleheads, once so rich a purple, and the milkweed pods, once heavy with their burden of brown seeds overlapping one another like the scales of some great fish, are now tossing aloft their white seeds by the handful.

An apple tree by the roadside has been embraced by a part of the winter's white flora, for the beautiful, plume-like fruit of the clematis, whose woody stems have climbed far up among its supporting and protecting branches, is adorning it.

Some fence corners and trees assume a floral whiteness, while others are beautified by crystals, and the buildings are "new-roofed with Carrara."[1]

From sheds new-roofed with Carrara
Came Chanticleer's muffled crow,
The stiff rails softened to swan's down
And still fluttered down the snow.

The brooks soon become fringed with white sculpturing; window-panes, fence rails, even the stones of the city's pavements, are decorated with dainty lace work in patterns that only Nature's fancy can evolve.

But, more wonderful than all these apparently accidental examples of winter's whiteness, are Nature's intentional changes in her efforts to adapt to their surroundings those creatures whose welfare will be enhanced by a resemblance to the generally prevailing character of the season.

PROTECTIVE COLORATION

Probably the most marked examples of such seasonal changes are afforded by the ptarmigan and the ermine weasel. In summer, the ptarmigan, a member of the grouse family, is mottled with black and a rich, fluffy brown but, in winter, it becomes pure white. The snowy owl and the snow-buntings, which come to us from the far north, have whitish plumage that blends harmoniously with the prevailing whiteness of the landscape.

[1] A very white marble.

But perhaps the most interesting example in all nature is the weasel, whose fur, in summer, has a peculiarly soft shade of reddish-brown but, in winter, except at the tip of the tail, is pure white. This black point is probably useful to its owner in diverting the attention of a carnivorous bird or of a beast of prey, as the black spot is more readily seen than the white body of the animal. It is said, too, that, if the tip of the weasel's tail is covered with snow, the whole animal becomes clearly visible. It is also said that, if the first snowfall is later than usual, the color change is delayed accordingly.

The arctic fox, in the far north, is snow-white throughout the year. Farther south, its coat is bluish-brown in summer but becomes white in winter.

TWO FUR COATS A YEAR

In the case of the plants above referred to, the tissues themselves are bleached. Animals become white through a change of covering. The summer coat of hair, fur, or feather, does not change in color, but is replaced by a new growth. This is well explained in the following description of the varying hare, in "American Animals":

"Much has been written on the change of color of the varying hare and other mammals and birds, but there are few subjects concerning which more mistakes have been made. We read of the change taking place in a single night, coincident with the first fall of snow and of the actual blanching of the individual hairs. One statement is quite as erroneous as the other. The change is really very simple. All mammals, in northern climes at least, shed (*Turn to page 55*)

PTARMIGAN

VARYING HARE

WEASEL

ANIMALS AND FLOWERS

TWO UNITS WHICH INCLUDE MANY THINGS TO DO

J. BUHR, FLORENCE EASTWOOD

•

FOR PRIMARY GRADES

Animals

J. BUHR

OBJECTIVES

1. To enable children to recognize common pets and other animals.
2. To teach them the following facts about these animals:
   a. appearance.
   b. food.
   c. homes.
   d. usefulness to man.
   e. characteristics.
   f. how they protect themselves.
3. To develop a feeling of kindness toward animals.

ACTIVITIES AND CORRELATIONS

1. Field trips to the zoo and to see kittens, rabbits, dogs, and other pets.
2. Writing.
   a. Writing names of the animals.
3. Art.
   a. Directed pictures of animals.
   b. Free illustrations for booklets.
   c. Cut-out animals.
   d. Posters.
4. Language.
   a. Oral discussion about animals to gain information.
   b. Cooperative stories as in a class booklet.
   c. Cooperative riddles such, for example, as the following:

I have big ears.
I have a little tail.
I can hop.
I like carrots.
What am I?

I say, "Wee Wee".
What am I?

I help the farmer.
I give you rides.
I can gallop.
I like oats.
What am I?

I am pretty.
I eat grass.
I say, "Baa Baa".
I give you wool.
What am I?

I am little.
I like milk.
I say, "Mew Mew".
What am I?

I am big.
I give milk.
I eat hay.
I say, "Moo Moo".
What am I?

I like to run.
I can play ball.
I eat meat.
I say, "Bow-wow".
What am I?

I am fat.
I like corn.

   d. Poems about animals.
5. Reading.
   a. Vocabulary.

Animal names.

cat	cow	pig
dog	horse	rabbit
sheep	chickens	goat
hen	squirrel	bird

Animal food.

corn	grass	meat
hay	milk	carrots
oats	acorns	nuts

Extra vocabulary.

fat	rides	like
pretty	help	ears
give	farmer	tail
wool	eat	

Baby animals.

kitten	puppy	lamb
colt	kid	
calf	chickens	

Animal sounds.

Bow-wow	Moo, Moo	Cluck, Cluck
Baa, Baa	Mew, Mew	Quack, Quack

6. Seatwork. Examples of the foregoing made up into booklets.

Flowers

FLORENCE EASTWOOD

AIMS

1. To give children an appreciation of the beauty of flowers as to their
   a. Coloring.
   b. Form.
   c. Fragrance.
   d. Texture.
2. To teach the care of growing flowers and their needs of
   a. Sun.
   b. Water.
   c. Air.
   d. Good earth.
3. To teach the parts of flowers and their uses.
   a. Blossom.
   b. Stem.
   c. Roots.
   d. Leaves.
4. To interest children in making flower gardens at home, caring for them properly, and reaping a reward of beautiful blossoms.

COMMON SPRING FLOWERS

1. Arbutus.
2. Rose.
3. Carnation.
4. Trillium.
5. Jack-in-the-pulpit.
6. Tulip.
7. Pansy.
8. Dandelion.
9. Violet.
10. Marsh marigold.

QUESTIONS

1. Which are wild flowers?
2. Which are garden flowers?
3. What are the colors of each?
4. How does each one grow?
   a. Close to the ground or tall?
   b. On vines?
   c. On bushes?
5. Where does each one grow?
   a. In wet places?
   b. Under leaves?
   c. In gardens?
   d. In dry, sunny places?
   e. In greenhouses?
   f. On lawns or beside roads?
6. Why do we have so many dandelions? How do they get planted? Describe their seed.

SEAT WORK

1. Show with your crayons the colors of each of the following flowers:
   a. rose.
   b. arbutus.
   c. carnation.
   d. trillium.
   e. tulip.
   f. pansy.
   g. violet.
   h. marsh marigold.
2. Seat work for following directions:
   a. Draw a purple tulip and two yellow tulips.
   b. Draw a trillium.
   c. Draw three red carnations in a blue vase.
   d. Draw a Jack-in-the-pulpit.
   e. Draw a dandelion.
   f. Draw a basket of pansies.
3. Draw a big pretty flower on a long green stem.
   a. Make some leaves on the stem.
   b. Make some roots on the stem.
   c. Put "b" by the part that is prettiest.
   d. Put "r" by the part that gets food for the plant.
   e. Put "s" by the part that holds up the flower.
   f. Put "l" by the part that takes air to the plant.

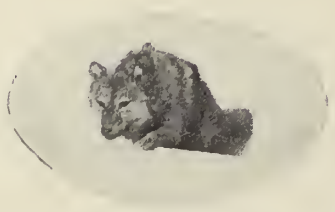
SELECTION TEST

Complete the following sentences by selecting the appropriate word from the list below:

a. A ..... has prickers on its stem.
b. A ..... has a little face.
c. A ..... has three white petals.
d. ..... grows under the leaves.

(Turn to page 61)

THOSE CUNNING FOXES



THE SILVER OR BLACK FOX is a handsome animal. He is black, with long silky hairs, many of them delicately ringed with silver gray. His tail is tipped with white.

THE GRAY FOX is dull gray, flecked here and there with black. His tail is gray-white on the sides, rusty below, and black at the tip.

THE COMMON RED FOX is beautiful. He is tawny red with yellow lights in his fur to match the yellow gleams in his eyes. The underside of his body and the lower parts of his back are grizzly gray. Along the underside of his body runs a narrow line of white. His throat is white. The backs of his stiff, straight ears, his keen pointed nose, his slender legs, and the tips of the hair on his tail are black and glossy.

THE FOX is proud of his tail. It is a warm golden-red color, light and feathery. When he runs it seems to float above him like a yellow torch shining against the white snow. But sometimes in wet weather, when he has run far his tail becomes damp, bedraggled and heavy so that he can scarcely carry it. Then he takes refuge in his den. There he stays until his tail becomes dry and light again.

FOX DENS

In the spring the fox goes out house-hunting. Sometimes he selects a good place, burrows deep into the earth, and makes his own den. But sometimes he can take possession of a burrow already made, by a rabbit perhaps. That the rabbit has made her home herself and is living there in peace and quiet makes no difference to the fox. All that is necessary is to get rid of the rabbit and that is not difficult for a fox to do.

Often a fox den is in the midst of an open field. This may be so that the wary creatures can see on all sides, and spy danger far off. New England foxes usually have but one or two rooms in their homes. These rooms are dark as pockets. But foxes do not mind. Their eyes, like a cat's, can see as well in the dark as in the light.

Usually a fox family has more than one den. If they find that one is being watched, they move to another as quickly and quietly as possible. Many a boy and dog have run up, after a long hard chase, to the mouth of a fox den, only to find it empty.

THE RED FOX

American Museum of Natural History

HOW FOXES LOOK

Fox cubs look like round, roly-poly, yellow gray bundles of woolly fur. Their tails are so short and stiff it does not seem possible that they will ever grow to be soft and plumy.

The mother fox takes good care of her babies. She feeds them young mice and rats. They grow larger and larger until some bright day she takes them out-of-doors to play.

The little foxes have pert, pointed faces, sharp ears, and bright, cunning eyes full of mischief. They frolic about like puppies, chasing their tails and pouncing upon each other. Often they make sudden onslaughts upon their dignified mother. They give short sharp yelps like baby puppies learning to bark. Sometimes they find a cricket hurrying home to his family and begin to worry him. But they forget him when a little cub finds a big, lazy June bug taking a nap. Sometimes they just sit quietly and look the field over with their bright, round eyes.

If there is a sound ever so faint, like the bark of a dog, the mother fox springs to her feet, warns her babies and away they scamper into their den.

It is said that when a fox has a den near a farmhouse, she never robs the hen-roosts of that farm. Instead she may go a long way to some distant barn for a tempting meal to bring home to her babies. While her cubs are small, mother fox will not risk being caught near her home. Both the father and mother fox will protect their young, even to losing their own lives. They will starve rather than take food away from their children.

FOOD FOR THE FOXES

Foxes eat all sorts of animal food. Each fox, when old enough, hunts by himself. He steals out cautiously at night and creeps carefully along, often going miles in search of the food he wants. No rabbit, squirrel, field mouse, rat or mole is safe when a fox is abroad. He likes fruit too, especially grapes. (Refer to the old folk story of "The Fox and the Grapes.")

The fox does not like to wet his feet. However, a fine crab sometimes tempts him so that he forgets his dislike of water. There is a story of a fox who used to drag his bushy tail back and forth lightly over the water. When a crab put up a claw and grabbed the tail, the fox dragged him quickly to land.

When a fox finds chickens at roost in a tree, he

has a strange way of catching them. He runs round and round the tree. The chickens watch, lean out farther to see what it is all about, grow dizzy, lose their balance and fall to the ground. Then the fox has his dinner all ready.

FOX TRAPS

Since foxes are such thieves, it is no wonder that farmers do all they can to catch them.

To catch a fox in a trap one has to have the patience and skill of the fox himself. The trap must not be placed near the chicken coop for a fox may be on guard there. It must be put in the woods or in a field where the fox is known to hunt.

Several days before the trap is set the trapper coaxes the fox. He cuts a place in the frozen ground and digs out three or four inches of earth. He fills this place with ashes or dried leaves in which are mixed bits of roasted cheese. For awhile the fox won't touch this tempting meal. But some cold night, he pokes among the ashes and has a delicious meal of cheese. Nothing happens, so he tries it again. After awhile, the trapper hides his trap in the bed of ashes and cheese. After all this trouble, however, the chances are that the sly fox will take a sniff or two, shake his head and trot quietly away.

If a fox is caught, he will fool the trapper if he can. Sometimes he plays that he is dead. There he lies, one foot in the trap, frozen stiff. The dog comes up and smells of him. The trapper may poke and prod him. He keeps perfectly still. If the trapper leaves him for a moment, there is a dash, a flash of a red-gold tail far off toward the woods and the fox is gone!

THE FOX AND THE HUNTERS

In no way does the fox show his cunning more than in the way he escapes hunters. On a clear crisp morning the hunters turn their dogs loose. Soon they may be on the track of a fox.

About a half-mile ahead of them runs the fox. He is so fleet of foot, so light of heart, so full of bounding life from the tip of his pointed nose to the end of his beautiful tail, that he leads the dogs a rapid chase. Up hill, down hill, on and on for miles they go with the fox eluding them at every turn. He bounds across dry stones in the bed of the brook, crosses and criss-crosses the field until his tracks lead in and out, back and forth over each other. Then he goes with long strides up the hill, and mounts a high rock. There he watches the dogs down below trying to unravel the puzzle of his footprints. Far off the fox sees the hunter, coming nearer with his gun.

The fox is up and away with nervous, nimble leaps toward the woods. He crosses a piece of ploughed ground, if possible. Then he walks coolly along the frozen rut of the high road where a sleigh or truck may have passed. He knows that no scent of his feet will stay in frozen ground. Or in warm weather he goes through a pasture and walks in the footprints the cows have left. The dogs have hard work tracing him in these places. He walks carefully in these tracks for awhile. Then he branches off, leaving the dogs to decide when they come up which set of tracks belong to him. Sometimes he is caught because he gets tired out at last, but just as often he escapes.

A STORY ABOUT A CUNNING FOX

It was a cold, moonlit night with the snow lying white and smooth over the ground. Jimmy walked fast. He was whistling to show himself that he wasn't afraid. Suddenly he heard a sharp, short bark. It didn't sound like a dog's bark. Jimmy bent his head to listen. There in the light snow, he saw a track. He saw many tracks, small and sharp. Jimmy stopped whistling. He knew they were fox tracks.

Jimmy had lived all his life in a little New England village. He knew that to see a fox, a boy must use great caution and cunning. So Jimmy crept to a clump of evergreens some distance from the path. He sat down on a rock to wait and listen. Wary as a fox himself, he peered through the dark boughs. Then he drew back scarcely believing his eyes. He looked again and caught his breath. Then he sat as still as the rock itself to watch.

Just beyond the evergreens was a cleared space. And this is what Jimmy saw. One—two—three—six foxes! They were beautiful, half-grown creatures with tawny tails flashing in the moonlight. It was plain to see that they were out for a grand frolic. They dashed round and round after their bushy tails. They jumped and capered. They ran into each other and fought play battles like merry school boys. They raced and chased in and out of the soft yellow light. One fox was ruddy red color. One was dark with thick, soft fur which would make him run for his life some day.

Suddenly a thought came to Jimmy. He had heard somewhere that if one gave a short, sharp squeak like a wood-mouse one could coax a fox to come close. Now there wasn't an animal anywhere around the village that Jimmy couldn't mimic. Often his mother thought she heard the cat mew to come in and opened the door only to find Jimmy there. All around the house in unlikely places, squirrels chattered, hens clucked, and turkeys gobbled. Crows cawed at night. Frogs chirped shrilly and *kerchugged* from high snow-banks. Now the time had come when Jimmy could use his talent to great advantage.

He shut his lips tightly and drew in his breath sharply and quickly. "Squeak, squeak, squeak." Surely that was a wood-mouse!

The fleetest of the foxes paused in his play. He turned his head, listening.

"Squeak," said the little mouse again softly. The fox bounded straight toward the clump of evergreen trees. He paused. Jimmy waited. After a minute, "Squeak, squeak," said the mouse in a voice that trembled a little.

A few swift, graceful leaps, and the fox stood face to face with Jimmy.

Jimmy sat very still. He was a little frightened. The fox showed no surprise. He stood still, one foot lifted, his plumy tail a graceful curve of light against the snow. His eyes were fixed on Jimmy's face a minute.

Then the fox slowly turned and trotted quietly away toward the woods. When he was out of sight, though, a great change took place. He jumped about and frolicked and capered merrily. "I fooled that boy," he thought. "I was frightened half out of my wits. But I didn't let him see it." Then the fox thought about that wood-mouse. With all his cunning, he had not seen through Jimmy's trick. He resolved that the very next night he would go back and find the mouse.

Jimmy ran home as fast as he could go. "My! Wasn't that fox handsome?" he said to himself. Then he barked exactly like a fox. Farmer Brown's turkeys woke and tumbled off their perches. They flapped their wings and cried so loud that the farmer came out with his gun and dog. "I'll catch that fox this time," he said. But we know there was no fox there for him to catch.

Animals of the Arctic

Material for your Arctic Unit

JOHN WATROUS

For Primary and Intermediate Grades

WHETHER they live in hot, cold or temperate climates, children the world over are interested and fascinated by all that pertains to the Arctic regions.

Last January we gave you studies of the Eskimos. This year we are going to focus our attention upon a subject equally attractive to children of all ages, the study of the animals of the Arctic, such as the whale, reindeer, bear, seal and walrus.

MAKING CHALK DRAWINGS

The illustrations on this page are reproductions of blackboard drawings which may be used as borders, January calendar designs, and the like.

Children always feel it is a special privilege to be allowed to work with chalk at the blackboard so why not let them try these and similar designs? The nature of Arctic scenery makes it particularly easy and appropriate for blackboard work.

Those who are not especially talented in free hand drawing will find the outline for drawing with the squares helpful. If this method is used, the size of the space to be used must first be determined and then the lines drawn to make the squares. Be sure that these lines are very faint so they can be easily erased without smudging the drawing. It is hoped, however, that many in your group may be able to do attractive freehand chalk drawings of these animals and their homes. The illustrations on these pages may also be helpful to the teacher herself in her blackboard work.

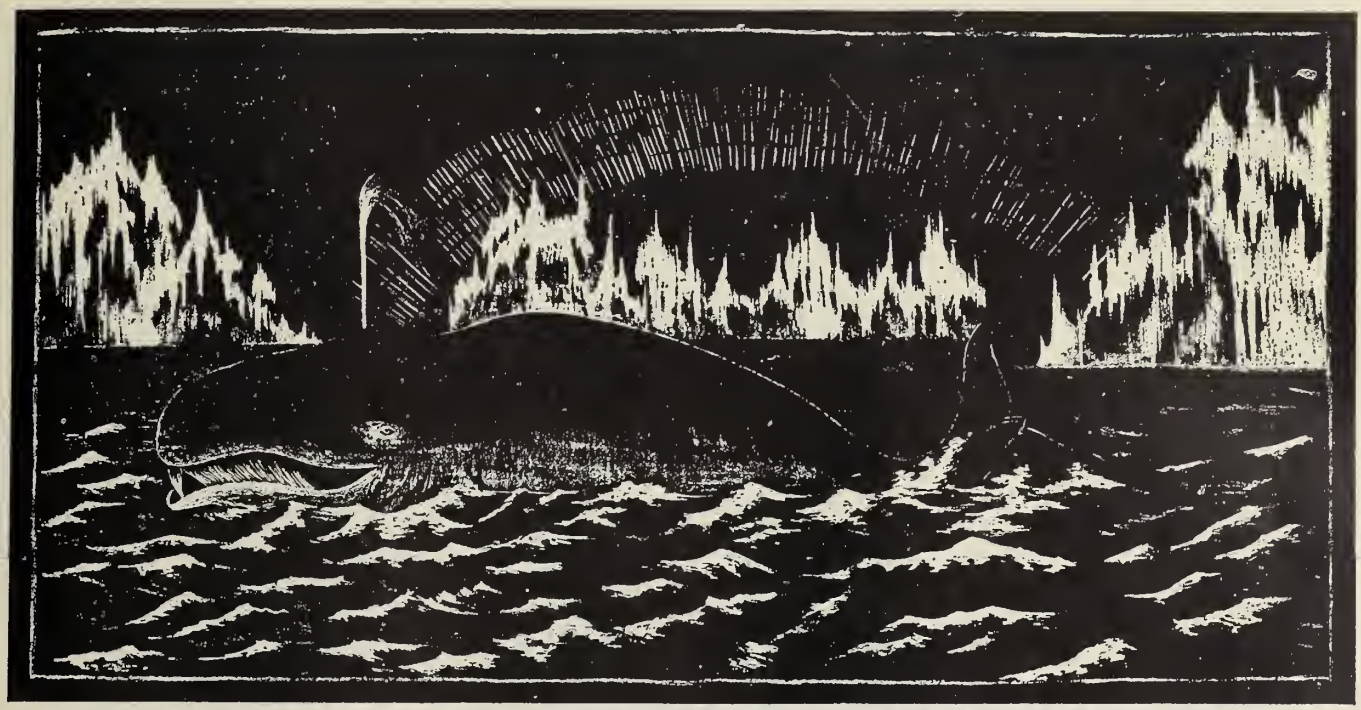
The aurora borealis may be done in colors and a slight blue tinge given to the icebergs if desired, though the scenes are very striking if carried out just in the black and white.

THE ARCTIC ANIMALS

The study may begin with the whale which is one of the most extraordinary animals in the world. The children may be surprised to learn that the whale is not a fish, for although he lives in the water, he breathes with lungs and not gills.

Whales are among the largest animals in the world, some of them being about seventy feet long and twenty feet wide. A whale must come up out of the water to breathe. He can be easily located by fishermen and whaling fleets by the long stream of water which he throws up when he comes to the surface to breathe. Unlike fish, the head of the whale is very large, being at least one-third of the whole body. The tail extends horizontally instead of vertically as in fishes. It is of great use in swimming. Under the skin of the fore limbs are bones and joints corresponding to the bones and joints of the human hand and arm.

The eye of the whale is small and set far back in the head. The mouth is very large, sometimes 15 feet long and 9 feet high inside. It is provided with plates of whalebone, which strain out the water and leave the small fish on which the whale feeds. The nostrils are at the top of the whale's head. They are used for breathing and for throwing out water. Whales travel quickly through the water at the rate of six miles an hour, flapping the water



with their large tails, making a noise heard for miles.

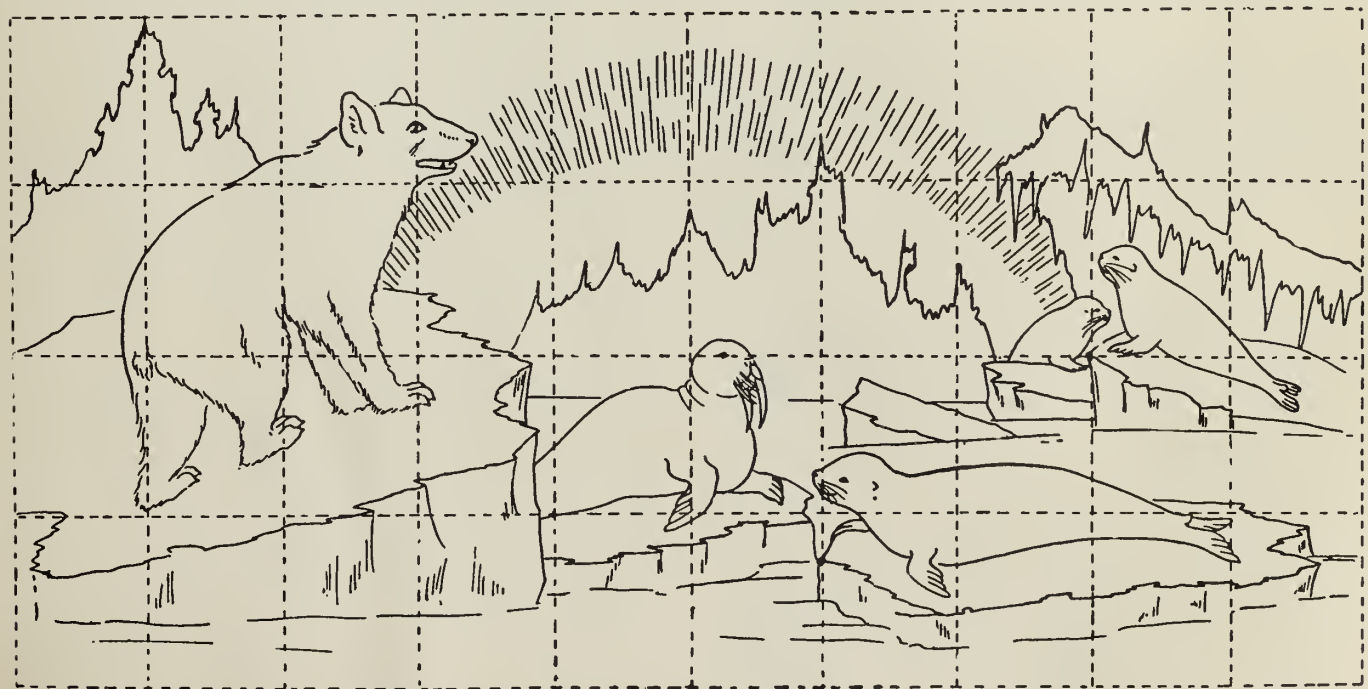
The principal method of capturing whales is by the harpoon gun. A harpoon consists of a long shank, with a broad, flat head, triangular shaped, sharpened at both edges, so as to more easily penetrate the body of the whale. Generally two or three boats join in capturing a whale. When the whale feels the pain of the harpoon, he swims away at a rapid rate under the water. After a time, he must come up to breathe. Then another harpoon is thrown at him. The whale has great endurance and puts up a long, brave fight. He succumbs finally to the pain of the harpoon and his great body is dragged away by the ships.

A single whale will sometimes yield eighty-five barrels of oil and a ton of spermaceti. They are found in largest numbers along the western coast of Greenland and in Behring Strait. They have grown scarce and the business of catching them has decreased since the use of petroleum for lighting purposes.

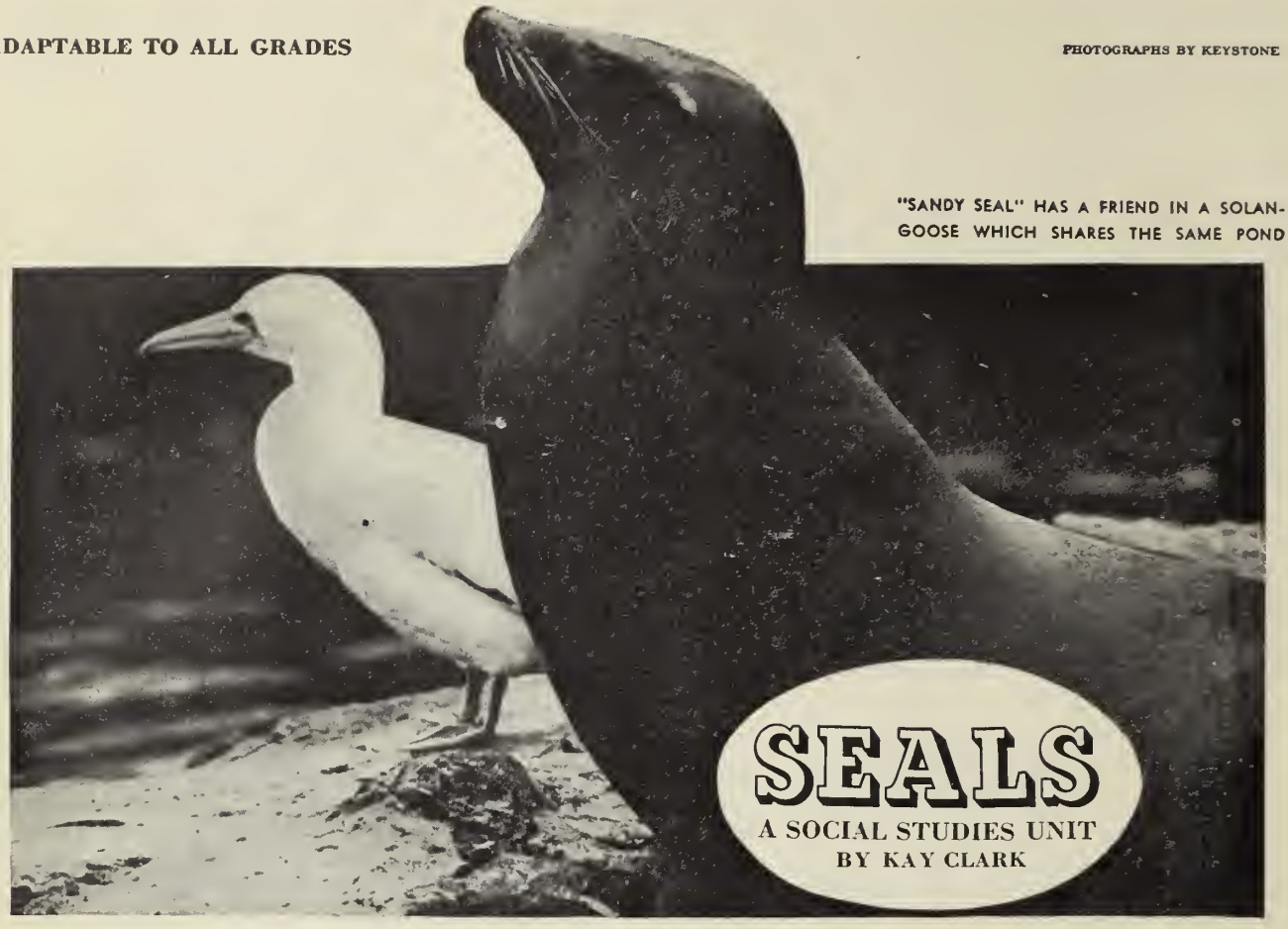
THE REINDEER

The reindeer has been called the Eskimo's good friend because it provides him with milk, flesh, and means of transportation. Children in temperate zones usually know little about the reindeer except the story of the eight who are supposed to carry St. Nicholas around the world on Christmas Eve.

The reindeer is found in Europe, Asia, Spitsbergen, and in Greenland. It is not as graceful as other species of deer. It is from four to six feet in height, with short limbs and neck carried almost straight forward. It has two toes on each foot, which are placed on the snow, besides an extra pair higher and behind the others to keep it from sinking deeply into the snow. *(Turn to page 58)*



PHOTOGRAPHS BY KEYSTONE



"SANDY SEAL" HAS A FRIEND IN A SOLAN-GOOSE WHICH SHARES THE SAME POND

SEALS

A SOCIAL STUDIES UNIT

BY KAY CLARK

INTRODUCTION —There are many avenues of approach for a unit on seals, especially now when there is great interest in Alaska, Greenland, and the surrounding oceans.

This unit may be used in all grades, the teacher selecting activities and material within the comprehension of her pupils.

In the primary grades, the family group is stressed, through the use of stories poems, trips to museums, circus or zoo. In the middle or upper grades, present conditions as brought out in the Social Studies class may arouse interest. There is excellent opportunity for dramatizations and story writing.

OBJECTIVES

1. To acquaint pupils with the seal fishing industry.
2. To create interest in lives of men who catch seals.
3. To teach the life and commercial value of seals.
4. To develop knowledge of effect of these last wars upon the seal industry.
5. To acquaint pupils with the code of ethics of these seamen.

APPROACH

The study of seal fishing may be stimulated by:

1. Stories of seals, anecdotes in the lives of fishermen, etc.
2. Study of Newfoundland, Greenland, and Alaska.
3. War—relations between United States, Great Britain, Russia, Japan. Refer to Treaty of 1911 between these nations. What is its status now? (Write Department of Interior. Washington, D.C., for information.)

OUTLINE OF STUDY

Furbearing Seals

These seals are located on the Pribilof Islands. Ninety percent of all furbearing seals live here in rookeries, from June to October. During the winter they live upon fish in the Pacific Ocean, yet they always manage to find the right route back to the Pribilof Islands.

The male seal, or bull, comes first and fights for a certain stretch of rocks. Then the female, or cow seal, arrives and is selected by the male to form his family. Some male seals have as many as fifty cows in a family depending upon his ability to fight. Then come the bachelors, or three year old males, who are not allowed to have a family because they are not strong enough to fight for one. These seals have the best pelts because they have not been fighting and have not had cuts and tears to ruin the skin.

Here on land the cow seal has one baby, or pup seal, which she feeds with milk. Although she may leave her baby when she swims miles away in search of fish for food, she always finds her own little seal when she returns, even though they all seem to look alike.

All summer long, the bull seal does not eat or drink. He just guards his family. Toward the end of the season, he sleeps for a week and eats until he is strong again. A bull seal weighs on the average of 500 pounds and the cow seal about 100. Except for the male, seals are easily caught. The bachelors are driven in herds a few miles away where they are killed and skinned. In 1880 there were millions of these seals but there was so much slaughtering and pelagic sealing (which is killing on the high seas) that the number decreased to 100,000 in 1910. In 1911 the United States, Great Britain, Russia and Japan signed a treaty which made pelagic sealing unlawful. Since then the seals have increased at a tremendous rate. It is estimated that the United States takes over 30,000 skins a year.

"SANDY SEAL" PLAYS BASKETBALL

BABY SEAL ON ENGLISH COAST

THIS HANDSOME SEAL SITS FOR HIS PICTURE

HARP AND HOOD SEALS

The law is off these seals March 14-May 1. They live in Baffin Bay, west of Greenland. In autumn they move south to spend the winter at Grand Banks. In spring, they turn north. At about the end of February the young are born. These seals furnish leather, oil, soap, medicine and perfume.

The Harp Seals are mostly white. The young are called whitecoats and weigh about seven pounds at birth. They are born on the ice which is called whelping ice (thin ice). The male and female make no attempt to defend the pups. The young ones make a queer noise like a combination of the bleating of a lamb and barking of a puppy. Seal hunters kill them by hitting them on the head with a bat. They are skinned on the spot, and the sculp, or hide, is placed on a rope, or ratline, and dragged to a marker (flag). The ship stops at these flags to pick up the sculps.

The Hood or Saddle Seal has greyblue markings on his back. He has a queer hood on his head which inflates when he is angered. Only the male has this hood. The Hood Seal will fight for his family and it is difficult to kill him because of his hood. These seals prefer the heavier ice and their young are born on this ice. These seal-pups make no noise and are harder to locate.

Ships sail from St. John's, Newfoundland, on seal hunting expeditions. Many steel ships are used instead of the wooden ones. Today a plane is used to locate the seals. Years ago, ships had to sail many miles before locating seals.

The ship's supplies usually consist of about eighty barrels of potatoes, eighty barrels of flour, one hundred quintals dried codfish, thirty-five barrels of pork, tea, butter, biscuits, turnips, beans, etc.

VOCABULARY

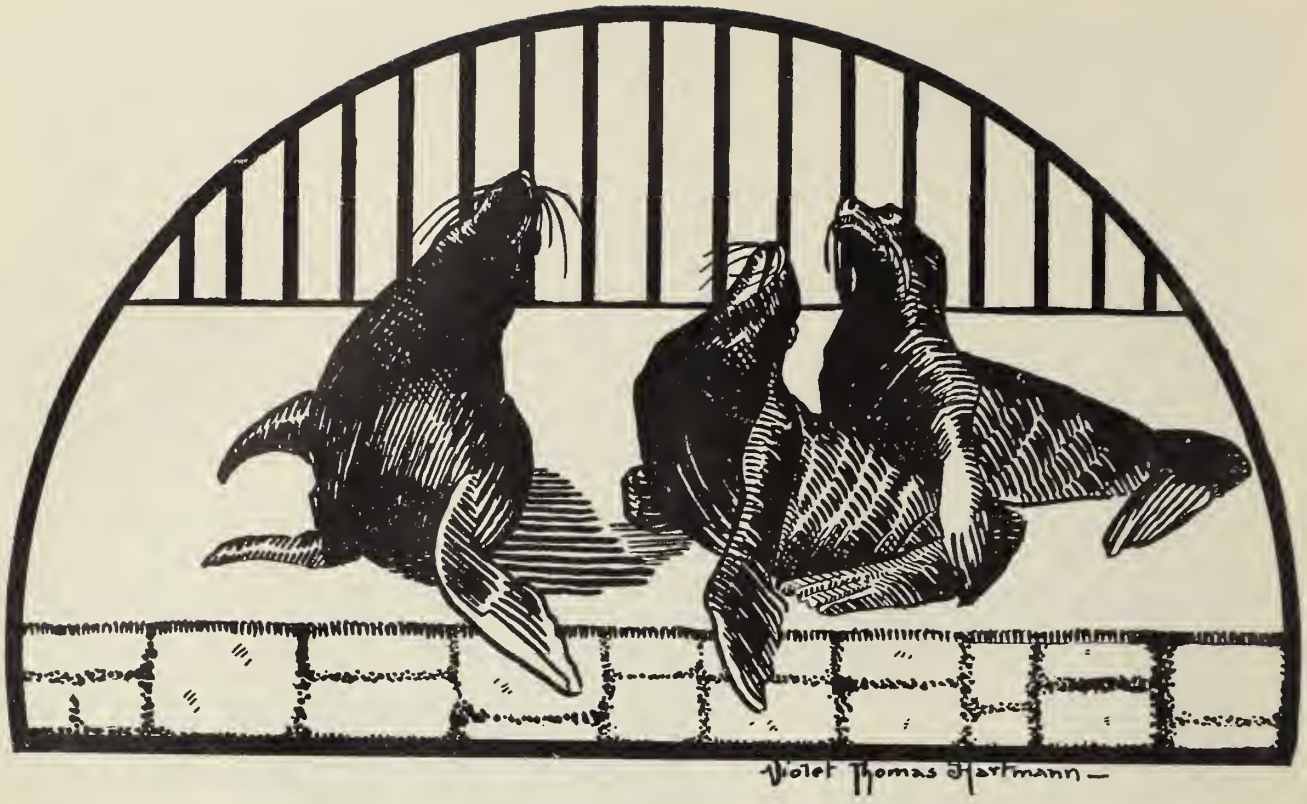
dunnage bag—bag containing clothes
nunny sack—bag containing lunch
crop—money advanced before sailing (about nine dollars) repaid plus $3
oilskins—waterproof clothes
quintal—112 pounds
whitecoats—young harps
steel gaff—stout shank divided into 2 parts, 1 straight point and the other curving out into a nook
bat—sticks of mountain ash, placed together with gaff to form weapon
sculp—seal hide
pan—ice sheet
brewis—boiled bread and codfish with pork gravy
duff—flour, water, shortening, currants, molasses; stirred, then packed in bags and boiled
pinnacle ice—ice from which salt has drained, used as drinking water
copy—skip lightly across small places of ice
nogg-head—motherless seal
chisels—nails on boots to prevent slipping on ice

Costume of Seal Hunters.—Canvas jumpers over sweaters, breeches of moleskin or homespun; several red or white flannel shirts, homeknit underwear, sealskin cap and goggles.

ACTIVITIES

1. Reading for information.
2. Giving oral reports on materials read.
3. Making maps showing location of seal rookeries.
4. Making illustrations of types of seals and their homes.
5. Making graphs, illustrating decrease and increase of seal population.
6. Painting costumes of fishermen.
7. Making equipment necessary to catch seals.
8. Keeping an imaginary ship's diary.
9. Learning to cook samples of brewis and duff.
10. Comparing steel ships with wooden *(Turn to page 62)*

LIBRARY
UNIVERSITY OF ILLINOIS



THE ZOO

~ How We Planned Our Unit

EVELYN THURBER

OBJECTIVES

a. To study maintenance of a zoo.
b. To gain more knowledge about animals in the zoo.
c. To teach the value of zoos.
d. To develop better community spirit through a better conception of our Park Department.
e. To increase interest in animals.
f. To inculcate habits of courtesy.
g. To teach child to express himself in writing stories and poetry.
h. To increase his vocabulary through dramatization and story writing.
i. To develop ability to originate, plan and initiate ideas.

APPROACH

During a conversation lesson, a pupil told of seeing four new lion cubs in Prospect Park Zoo. The children were all interested and the suggestion made that we go to see it. Letters were written to parents asking permission to go on this excursion. It was necessary to go by train. This led to discussion of the route to be taken. Each pupil brought ten cents carfare. The money was counted by the class and amount put on the blackboard. This was an excellent opportunity to teach "dollars and cents."

Before going on our trip, we discussed rules of conduct on the train and at the zoo. Necessity of courtesy to those in charge and to classmates was emphasized.

The trip to the zoo was quite a success. We arrived in time to see the animals being fed by the keepers. This was especially interesting to watch.

When we returned the children were full of stories and things to tell. This was an opportune time to suggest making our own zoo. The children were overjoyed at the idea and started the activity with enthusiasm.

DEVELOPMENT OF THE UNIT

1. *Class Discussion.*—Children discussed the classroom zoo. A list of suggestions was written on the blackboard as they occurred to the children.

2. *Organization of Committees.*—I explained what a committee and its duties are. We listed committees necessary to carry on the work. A chairman was selected by me for each committee.

3. *Activities.*

a. Making the Cages. Due to lack of space in our room, it was decided to make cages out of construction paper and tack them on the walls. The children drew the cage fronts on grey construction paper. This involved use of ruler and inch measurements. They cut away spaces between the bars with scissors. These cage fronts were then

It's fun to visit at the zoo
To see the tricks the seals can do.
I hear them when we reach the park
For they have such a deep, loud bark.
And when the keeper throws them fish
They make the water splash and swish.
I'm sure that I could swim and float
If I had such a slickery coat.

— Violet Thomas Hartmann

pasted by their four edges on a black background. The cages varied in size according to the animals for whose use they were intended. During the making of the cages, the children learned about the construction and maintenance of real cages they had seen in Prospect Park Zoo. Before making the cages, they had decided what animals they were going to have in their zoo.

b. The Animals. The children drew some of the animals and cut out pictures from magazines of the more difficult ones, so as to have a large enough variety of animals in the zoo. When the animals were ready, they were inserted through and behind the bars and pasted there.

c. Making the Signs. Signs were made indicating the occupants of the various cages. "Do not feed the Animals," "Do not annoy the Animals," "To the Lion House," "To the Polar Bears" were some of the signs made.

d. Making the Food Chart. The committee listed all the foods needed for animals of their zoo. They secured information from books in the "Zoo Library." When this was completed, two of the children printed the information on a chart.

e. Making Booklets. Ten children chose this committee to work on. A different animal was studied each day by the entire class. The children learned about the size, shape, appearance and habits of the various animals. Children on the booklet committee then wrote stories about the animals and pasted them in their booklets. The completed booklets contained compositions of all the animals in the zoo. These booklets were to be given to the visitors of the zoo. The following story is typical:

THE POLAR BEAR

The polar bear is taller than other bears. He is covered with thick white fur. He has a sharp pointed head with a jet black nose. His sides are flat. He likes to eat meat and fish. We call our polar bear "Snowball." He likes to go swimming in the cold water.

f. Covering the Booklets. Three boys made all the covers for the booklets. Each cover was decorated with an appropriate animal picture and the printed words, "The Zoo."

g. Making Posters. Several children made posters about the zoo. These announced the opening of the zoo and were displayed in the class room and outside corridor.

h. Zoo News. A bulletin board was constructed and an envelope for "Zoo News" contributions tacked on the wall. The children wrote riddles and stories and brought in pictures and newspaper clippings pertinent to zoos. These were deposited in the envelope on the wall. A child was selected to edit the above contributions. She also recorded the progress of the different committees from day to day and posted this on the bulletin board.

i. Making Hats. It was decided to make hats for the keepers. They were made of green construction paper—a round band for the head with a visor fastened in front. "Keeper" was printed on the front of the caps. During the course of the activity several repairs were necessary, so a hat was made for the repairman.

j. Information Booth. While the children were making the booklets, the question arose as to where they should be displayed and distributed in the zoo. A suggestion was made to build a stand or booth. The children used three orange crates to build the booth. It was finished with aluminum paint and an awning with the word "Information" tacked to the top. This was made out of yellow construction paper. A chair was made out of another orange crate and placed behind the booth. A child attendant was selected to answer questions and show booklets to visitors.

k. Zoo Dictionaries. The entire class made lists of new words that came up in the development of the activity. These lists were referred to in writing stories for the booklets and contributions for "Zoo News."

l. Zoo Library. Stories of animals and references were in the library books in the room. The children were allowed to read these books when they finished tasks or to refer to them for information.

m. Feeding Time Clock. A sign "Feeding Time" was made and tacked across the top of a clock dial. One of the keepers was assigned to set the clock and indicate the next feeding time. The children learned to tell time through the use of this indicator.

n. Naming the Animals. One day a child told of a story he had read about a zoo. The animals had pet names given to them by the keepers. The suggestion was made that we christen our animals. This met with a delightful response. The class voted on names suggested by the children. In each case, the most appropriate name was the choice, such as:

Elephants — Jumbo and Samson
Polar Bear—Snowball
Zebras — Blazer and Peppermint
Tiger—Ginger
Giraffes—High Boy and Dot
Brown Bears—Teddy and Browny
Leopard—Spotty
Lion—Leo.

o. The Peanut Stand. The children had purchased peanuts when they *(Turn to page 63)*

VIOLET THOMAS HARTMANN

A Science Shelf for Your Classroom

BY IDA K. BRINK

A SCIENCE shelf on which children place cocoons, fossils, tadpoles, and other treasured "finds" fills an important need of children in almost any classroom. Teachers are finding such a shelf a means of teaching not only science but also of promoting learning in other fields as well.

A broad shelf or small table, available in most schools, provides sufficient space for science materials usually on hand at one time. This shelf is a special place where science articles are safe and where they may be shared with classroom friends. It is an interesting place to spend odd moments before school or during the day.

If a science shelf is started early in the school year and continued until the last spring wild flower finds a place on it, the shelf is an almost constant source of interest.

Although it starts as a convenient place on which to deposit a variety of science objects found at home, on the way to school, or on the playground, it grows, under the guidance of the teacher, to be a center of learning from which many valuable educational outgrowths develop.

First of all, of course, is learning in the field of science. Children learn many new science facts, develop science interests and scientific attitudes as they observe and work with the objects on the shelf. Occasionally an interest leads to a science unit.

Another important outgrowth is that of reference reading which results from the children's curiosity about objects on the shelf. Most children are not content with merely looking at these objects. They demand answers to questions about them, such as, "What is it?", "Where did it come from?", and so on.

Of course, the best answers to these queries are usually found in science reference books. So, if a few single copies of well selected science references are placed on or near the shelf, the children will read widely in many sources to find satisfying answers to their questions. This increases the amount of purposeful reading they do and also affords practice in the use of the index, table of contents, reading graphs and other reference reading skills.

MATERIAL

If the books are of varying reading difficulty, they provide for the wide range of reading ability usually found among any group of children—easy material for the poorest readers and difficult material to challenge the best. Copies of *Nature Magazine* and *National Geographic* increase the range of reading difficulty and enrich the information available in the usual science references.

A small bulletin board placed back of the shelf provides a space for pictures, newspaper clippings, and diagrams related to objects on the shelf.

A small hand lens is a valuable piece of equipment for a science shelf. With it children "see the unseen." It magnifies the marvels of nature too minute to be seen clearly or in their full beauty with the naked eye. The contents of a mud wasp's nest, the barbs on a porcupine's quill, the eye of a bee are but a few of the unseen wonders revealed by a hand lens. The science department will sometimes loan a microscope for the still more invisible in science.

Other important outgrowths lie in the values resulting from the expression of ideas either during free time informal conversation around the shelf or in organized science or conversation periods when children pool information discovered in examining the objects or in reading about them. Critical thinking, use of correct English, crips-to-the-point expression of ideas are all practiced when children talk science. It is a stimulating experience.

The science shelf also arouses definite needs for making use of the manual arts for living things, as tadpoles, insects, pets must be taken care of. This calls for construction of aquaria, terraria, screened cages and similar structures. Such building requires planning and measuring to conserve materials and to get satisfactory results. It requires building structures in which it is possible to duplicate closely the natural habitats of the various living things that occupy each structure. Mounting boards are needed for moths that emerge from cocoons. Glass covered cases are required for collections. These are challenging problems that keep children alert and occupied at worth-while jobs.

A science shelf may also arouse leisure time hobbies, such as collecting fossils, mounting butterflies, pressing specimens of wild flowers, making leaf prints.

ARRANGEMENT

There is one problem that frequently arises with a science shelf, i.e., how to so arrange the objects to keep the shelf always orderly and attractive. Too many things give a cluttered appearance, too few make it barren and uninteresting. A class discussion of how to organize material brought in from time to time will result in a workable plan, such as the following evolved by one group of children.

1. Form committees to keep the shelf dusted and in order.
2. Group like objects together on mats of 9x12 colored paper, as all clam shells on one, all wasp nests on another.
3. Label each object with a small neat card bearing the object's name and the name of the child who brought it in.
4. Make space for new things by removing old ones when no longer of particular interest.
5. Make exhibits of things removed by placing them in a hall showcase or science room where children of other rooms may see them.

Following such a plan results in another important educational outgrowth, i.e., practice in keeping materials so organized to make them usable and attractive.

So, if the science shelf is conducted as a learning center, it becomes not merely a place where objects are left and soon forgotten. It develops into a classroom opportunity for enlarging children's knowledge of the outdoor world, for utilizing reading, language, and manual skills with definite worth-while purposes, and for directing children's curiosity toward enriched, educative channels.

Nature Study Club

(Continued from page 6)

bles must be planted and must grow to maturity. (2) Five kinds of flowers must be planted and must grow until they blossom. (3) A tree must be set out either in April or in October and must grow until it puts forth leaves. (4) A bird house must be made and kept up at least a month. (5) Five new butterflies or other insects must be mounted and labeled.

During the fall and winter months, instead of (1) members may start a little nursery of five seedlings, or may present five kinds of wood with their bark, each correctly labeled. Instead of (2) five potted plants may be started and cared for at least a month.

Purple ribbon members receive a package of colored bird pictures.

For an orange ribbon, the child is required: (1) To have some part in putting up or caring for a bird bath. (2) To see that a feeding trough for birds is put up, preferably one made by the member himself. (3) To pull at least five hundred rag weeds to help prevent hay fever. (4) To submit a list of twenty-five additional names of living things which the candidate has seen.

Ants

(Continued from page 12)

(7) The ants build barns for their cows.
(8) Ants cross feelers when they meet.
(9) Ants have six legs.
(10) Ants never work.

Key for scoring
X = Yes; O = No.

1. X	6. O
2. O	7. X
3. O	8. X
4. X	9. X
5. X	10. O

SECOND GRADE NEWSPAPER

The following sentences were dictated by our pupils during their study of ants.

There are five thousand different kinds of ants.

The Queen ant takes care of the eggs.

When the ants have battles, the ant nurses try to save the babies.

The male ant has the best eyes.

The workers have the poorest eyes. Some workers are blind.

The ant's head may be round, triangular, square, heart- or pear-shaped.

Ants use their tongues just as cats do.

Ants live for ten or fifteen years.

Ants eat seeds and grains of wheat.

Some ants form ladders, or bridges, so that others can cross rivers.

Ants tunnel under railroad tracks.

The mother feeds the baby ants with a juice she has in her mouth.

Ants have a secret passage leading out of their homes.

Turning White

(Continued from page 44)

their coat twice a year, acquiring a thicker fur in winter and a thinner one in summer and, in the varying hare, the winter coat is white while the summer one is brown. The individual hairs never alter their color from the time they appear until they fall out. The change from brown to white occurs in the autumn and for a short time the animal is somewhat 'mottled.' Then, in March, as the weather gets warmer and the snow gradually disappears from the woods, the fur of the northern hare, probably by reason of the wearing away of the tips and the shedding of the long hairs, gets more and more mottled with brown. The change, in most cases that have come under my notice, commences at the back of the neck, on the feet, and the under surface of the body and, in an astonishingly short time, the dark summer coat is fairly resumed. Although belated snowstorms must often give them occasion to regret the loss of their winter coats, taking one year and another, the change seems to be wonderfully well timed, and at most they are really no worse off than those other inhabitants of the woods that wear their dark coats throughout the winter."

Animal Life Worksheets

(Continued from page 31)

4. A puppy is whose name?
5. What is the name of a baby chicken?
6. What is a sheep's baby called?
7. What is a baby pig called?
8. What is a mare's baby called?
9. What is a baby duck called?
10. A gosling is whose baby?
11. What is a baby deer called?
12. Whose baby is a kid?
13. What is a baby bear called?
14. What is a seal's baby called?
15. What is a wolf's baby called?
16. What is a reindeer's baby called?

KEY

1. poult	9. duckling
2. cow	10. goose
3. kitten	11. fawn
4. dog	12. goat
5. chick	13. cub
6. lamb	14. puppy
7. piglet	15. cub
8. colt	16. calf

I Heard a Bluebird Sing

Out in our leafless apple tree
I heard a bluebird sing,
To say that winter's past and gone,
The world belongs to spring,
While March winds blow and from the sky
Fall flakes of drifting snow,
I know that Spring is near,
The first bluebird tells me so.

—LAURA EMILY MAU

Frogs

(Continued from page 18)

nearest shore. He usually selects a dry spot on or near the bank on which to sun himself and from which, if disturbed, he can jump into the water. His memory, however, seems to be a short one since, if the intruder remains still, he will soon return to his place and resume his song.

CORRELATIONS

1. Language.
   a. Give a program for another first grade and have the children tell what they have learned about frogs.
   b. Compose a group story about frogs.
2. Music.
   a. "Frogs at School".
   b. "Early Spring".
   (Music Hour in Kindergarten and First Grade, Silver, Burdett & Co., Boston, Mass.)
3. Art.
   a. Have the children make drawings of a pond and include the various plants found around swamps.
   b. For free work have them make sketches of frogs and pollywogs swimming.
4. Writing.
   a. For group work develop sentences and illustrate them such, for example, as the following:
   Carleton and Richard brought some pollywogs.
   The turtle ate the tadpoles we put in his bowl.
   The pollywogs in the goldfish bowl are the biggest.
5. Reading.
   a. Charts.
   b. Stories: "Little Tadpoles", Rand McNally, Chicago.
   "Blue Pond", "Round About" Row, Peterson Co., New York.
   c. Poems:
   (a) "The Frog", by Hilaire Belloc,
6. Multiple Choice Test.
   a. The pollywog comes out of (a) shell; (b) egg; (c) cup.
   b. We find frog eggs (a) in the bottom of a pond; (b) in the grass around the edge; (c) on top of the water.
   c. Pollywogs like to eat (a) scum; (b) flies; (c) insects.
   d. Frogs like to eat (a) scum; (b) flies; (c) fish.
   e. How many legs does a frog have? (a) one; (b) two; (c) three; (d) four.
   f. How many years does it take an egg to grow into a frog? (a) one; (b) two; (c) three.
   g. How many legs does a tiny pollywog have? (a) one; (b) two; (c) none.

Key: a, (b); b, (b); c, (a); d, (b); e, (d); f, (c); g, (c).

How Animals Keep Clean

(Continued from page 41)

which are especially cleanly animals, also use their tongues for brushing and cleaning their fur. Few wild animals have a disheveled coat. Various domestic animals, such as the ruffled guinea pig and some fowls, have been purposely bred with roughed-up coats, but nature seems to have little liking for such costumes.

How beautifully bright and neat the birds in general keep themselves! How smooth and spotless is the soft plumage of the ring-dove! The elaborate plumage of the wood-duck is spread out so smoothly and in so beautiful a pattern that the slightest disarrangement would spoil it. Domestic fowls spend considerable time in oiling and smoothing their feathers, doing it all with their bills. Even the awkward-looking bill of the pelican performs a similar task. Birds with very long beaks are unable to reach parts of their necks with them, but their neck feathers are usually short enough to stay in place without much care. If the neck feathers are long, the bill can usually get hold of the ends and so straighten them out.

Birds often bathe. No doubt you have often seen the English sparrow splashing in the water after a rain, or even in a little pool in the gutter. Some birds will dash, for a moment, against the surface of a pond and so give themselves a superficial washing. Often, when I have been using the hose to sprinkle my garden early in the morning, with the water broken into spray, I have seen a robin look with longing eyes at the tempting mist, running nearer and nearer, and becoming bolder and braver, until he finally stood under the falling drops. Every owner of a canary knows how the bird rejoices in his daily bath and what an active, splashing performance he makes of it. One of the most delightful ways of attracting birds to one's lawn or garden is to provide a good-sized bird bath and keep it filled, during the spring and summer months, with clear cool water. On a warm summer's day I have seen a kingbird, a Baltimore oriole, and two bluebirds taking advantage of a bird bath within a few minutes of one another. Standing in the shallow pool, they repeatedly dashed their bodies under the surface, fluttered their wings to shake off the surplus moisture, and then flew away to a nearby tree to dry themselves in the sun, serenading me, meantime, with a burst of joyous song.

Even the insects, as far as the naked eye can observe, keep "slicked up". Wasps, mud-daubers, flies, and mosquitos brush themselves with great care, using their forelegs for head brushes and their hindlegs for their wings. After a fly has brushed his head and face, he always rubs his feet together as if he were rolling the dust into a ball ready to be dropped and thrown away.

QUESTIONS

1. What mistaken idea do people have about pigs?
2. Why is a pigpen usually a dirty place? Is it possible to have it more cleanly? How?
3. If you see cows which look dirty, what do you think about the farmer who owns them? Would you buy milk of him? Why not?
4. How do horses help to keep themselves clean if they are allowed the freedom of a pasture?
5. How do cattle keep themselves and their offspring clean?
6. Tell how you have seen your cat slicking herself up after eating.
7. How do squirrels and rabbits wash their faces?
8. What proof can you give that nature does not like roughed-up coats and uncleanly-appearing animals?
9. How does the pelican look after his toilet?
10. Did you ever see an English sparrow splashing in the water after a rainstorm? Describe what it does.
11. If you have a canary bird for a pet, what should you do to help him in his daily bath?
12. Have you ever seen an outdoor bird bath? Have you one in your lawn or garden? If so, describe it and tell what birds you have seen bathing in it.
13. Describe a peculiar habit of the fly which shows him to be a cleanly insect.
14. What do you think about the necessity of cleanliness for hens and chickens?
15. If you have pets of your own, tell some of the things you should be particular about.
16. If our animal friends have such neat habits, what do you think should be true about the habits of their owners?

ACTIVITIES

1. Draw a picture of a cat washing his face after eating.
2. Draw a picture of an English sparrow splashing in the water.
3. Draw a picture of a canary in his cage, showing his little bathtub.
4. Draw a picture of a clean pig and four little ones in the right kind of a pigpen.
5. Write a little story telling about experiences you have had with your pets, like rabbits or canaries, showing how keeping clean adds to their health and well being.
6. Draw a picture of the right kind of hen-coop, showing the hens and chickens enjoying the henyard.
7. Draw a picture of a bird bathing in an outdoor bird bath.
8. Draw a picture of your dog enjoying a swim in a pond.

Honeybees

(Continued from page 11)

is like a fine, sharp ————

i. Bees always make their cells ————.

j. A bee has ———— legs.

(a.) six sided	(f.) work
(b.) winter	(g.) fly
(c.) trees	(h.) royal jelly
(d.) needle	(i.) smallest
(e.) pollen	(j.) six

Key for Scoring:

a (c) c (b) e (e) g (g) i (a)
b (f) d (h) f (i) h (d) j (j)

4. Matching Parts.

Match the beginnings of the sentences in Column I with their proper endings in Column II.

Column I

a. Nectar comes
b. Baby bees
c. Bees carry
d. The workers
e. Each worker
f. The queen bee
g. The bees' home
h. The nurses

Column II

(a) eat beebread
(b) from flowers
(c) care for the baby bees
(d) lays eggs
(e) has two pollen baskets
(f) honey in a honey sac
(g) is called a hive
(h) chew wax to soften it

Key for Scoring:

a-(b) b-(a) c-(f) d-(h) e-(e) f-(d) g-(g) h-(c)

5. Choosing the Right Word.

Draw a line under the appropriate word to complete the sentences.

(1) Bees give
a. honey, b. hats, c. houses
(2) Bees can
a. sting, b. swing, c. sing
(3) Bees make
a. coats, b. cells, c. caps
(4) Bees get nectar from
a. fruit, b. fish, c. flowers
(5) Bees carry
a. pollen, b. pins, c. paints
(6) Bees can
a. bleat, b. buzz, c. bite
(7) Bees have six
a. lungs, b. lumps, c. legs
(8) Bees live in
a. huts, b. hives, c. homes
(9) At the door of the hive you find
a. giants, b. girls, c. guards
(10) Bees keep their homes
a. close, b. clear, c. clean

Key for Scoring:

(1) a (3) b (5) a (7) c (9) c
(2) a (4) c (6) b (8) b (10) c

The Squirrel Unit

(Continued from page 40)

A. Red squirrel B. Gray squirrel C. Flying squirrel.

	A	B	C
1. He is easily tamed.			
2. He gnaws the tree to get sap.			
3. He is very beautiful.			
4. He likes to chatter.			
5. He looks like a ball of fur when he sleeps.			
6. He likes a roomy nest.			
7. He has large eyes.			
8. He is very fond of pine seeds.			
9. He has a broad tail.			
10. He lives in city parks.			

The Cat and the Dog

(*Continued from page 33*)

F. Recognizing Tracks of Animals

Peter went into the garden.
He saw some tracks in the snow.
Here are the tracks.
Do you know who made them?

a. cat b. bird c. dog d. rat e. rabbit

Key

1. c 2. e 3. b 4. d 5. a

G. Blank Filling and identifying parts of dog by writing in letters.

1. I am a ———.
2. I see with my ———.
3. I smell with my ———.
4. I hear with my ———.
5. I eat with my ———.
6. I run with my ———.
7. I can wag my ———.
8. I made these ———.

(a) tail (e) ears
(b) mouth (f) eyes
(c) nose (g) puppy
(d) feet (h) tracks

Key

1. g 2. f 3. c 4. e
5. b 6. d 7. a 8. h

Queer Flying Things

(*Continued from page 17*)

spiders avail themselves of breezes and currents of warm air to carry their light and naturally buoyant balloons.

QUESTIONS

1. Which of the flying animals most perfectly illustrates the principle of the airplane?

2. What fish flies in a similar way?

3. Where are they most often found? (See *Compton's Encyclopedia* and the *World Book*.)

4. Who was Henry David Thoreau?

5. Explain the difference between the flight of a bird and that of the flying squirrel.

6. Where is the flying tree frog most commonly found?

7. What is a chameleon? In what respect is the flying frog similar?

8. What other name is often given to the flying tree frog? (The flying tree toad.)

9. How does this little animal hold his place on the trunk of the tree?

10. What peculiar flying insect do we find in Texas?

11. How far can she fly? How does she carry her young ones?

12. How did the aeronautic spider get its name? (Look up the meaning of aeronautic.)

13. Describe how this spider goes to work to manufacture her aircraft. (See THE GRADE TEACHER for June, 1937.)

14. Draw a picture of the aeronautic spider.

15. Have you read in the newspapers about the Black Widow spider? Why does it have that name?

16. Why should children not handle spiders? (One may be bitten by a poisonous spider and made very ill. Death may result from the bite of the Black Widow spider.)

17. Why is the operator of an airplane called an aviator? (The name comes from the Latin word "avis", a bird, so that the word "aviator" means a man bird or a man who flies.)

18. The term aviator—man bird—is not entirely appropriate, since the movements of an airplane have only a remote resemblance to the movements of a bird in flight. Explain some of the differences.

19. Why does the author say that neither airplanes nor flying animals, other than birds and bats, are true flying machines?

20. Do you suppose our aviators realize what interesting little rivals they have in the art of flying? Why?

21. Are you more interested now in studying the airplane, man's flying machine? Why?

THINGS TO DO

1. Select any of these flying animals or insects which you have seen and write a little story about your experience, drawing a picture of the animal or insect which you are telling about.

2. Look up the life of the Wright Brothers and see if you can find out to what extent they studied the objects of nature in developing their invention of the flying machine.

3. Write a paragraph explaining the difference between the terms "flying" and "soaring". For example, we often hear the hawk spoken of as soaring, rather than flying. (Briefly, we think of flying as passing through the air by the aid of wings in motion, as the ordinary bird flies. When the wings are not in motion, as is often the case with the hawk, and the bird's body is sustained only by the current of air through which it is passing, we say it is not in flight but is soaring.)

4. Make a list of the most famous aviators of whom you have read, including both men and women.

5. Now we are ready to begin our airplane unit. Make a little outline of the way in which you would like to begin your study.

Crusty, the Hermit Crab

(*Continued from page 22*)

He dragged his roommate and the old homestead behind him searching for a new home. He looked behind stones and under tree roots. He looked everywhere but each suitable house was filled. Finally he found the very thing, a fine snail shell house, on the edge of a tidepool.

It was a splendid place to live. He had a good view overlooking the water. Any Hermit Crab would like that house, so he slipped out of the old shell. But he forgot to be careful. He did not look first to see if Mr. Sandpiper was anywhere around. Before he could back into his beautiful new house the Sandpiper hopped into sight not far away. Crusty took one look and dived into the pool. He did not so much as move a claw after he got under a rock on the very bottom. He was frightened.

Mr. Sandpiper waited and waited. He hopped from one side of the tidepool to the other. He cocked his head this way and that but he couldn't fool Crusty who lay very still. Finally a sand flea jumped and the Sandpiper rushed off to capture it. He forgot all about Crusty.

But Crusty did not forget about Mr. Sandpiper. Nor was all danger over for him. Just as he was about to come out of the water a small fish darted close to him. Crusty shrank back.

After awhile he arose to the surface An unhappy sight met his eyes. There was his beautiful moon shell house disappearing down the sand. He would be homeless again if he didn't get his house back. Crusty was a brave little fellow. He hurried after his house as fast as he could go. Finally he caught up with it. There inside was another Hermit Crab, bigger than Crusty. But, by pulling and tugging, Crusty pried the Hermit Crab loose. Out he came with a jerk! He lost one leg in the fight, but he didn't mind, for a new one will grow right back, in the crab family. He bounced away angrily as Crusty backed into his lovely house.

Many times after that as Crusty grew larger, he was obliged to change houses. He seemed to like moving. He grew into a great fighter. Nowhere on all the beach was there a crab that was his match.

Squirrels

(*Continued from page 43*)

little parents. Then come busy times. The babies must be fed and cared for. So an all-day scamper and scramble for food begins. And all the time one must watch out for sounds and scents that mean "A dog is coming." "There is a boy with a gun! Run! Run!"

Busy as they are, chipmunks have plenty of time for play. Did you ever see two or three of them have a game of tag? Round and round they scamper, first one ahead, then another. Meanwhile they chatter and scream, and seem to have as good a time as school children out at recess.

The gray squirrel is much larger than the red. He is an elegant little fellow. The upper parts of his body are gray, the under parts are white, and there are yellowish-brown dashes of color on his back and sides.

His ears are high, narrow, and pointed. He has a magnificent bushy tail, of which he is very proud. His tail is more than an ornament. When he takes a leap from some tall tree, he arches his great tail and this helps to break his fall. When he goes to sleep, he wraps it about him, like a warm, furry blanket. A story is told of a gray squirrel who once lost part of his tail. He was heart-broken. He went away and hid, and nothing could coax him from his hiding place.

The gray squirrel lives in the trunk of some old tree. The entrance is far up among the branches. When spring comes, the little fellow seems to feel the need of a summer home. So he selects a new and pleasanter location—usually in a tree not far from his winter residence.

Here he builds a pretty cottage of small, leafy twigs. To this home he brings his mate, and here the baby squirrels are born and brought up. The old home is not forgotten. The squirrels often visit it. And when they are in danger, it is to the hollow tree trunk that they scamper for safety.

Gray squirrels are easily tamed. In some cities they play about the paths of public parks and along the roadsides and seem quite as much at home as the children who pet and feed them. In these cities, laws are made to keep people from killing or harming the tame squirrels.

A little girl who lives in New York City once told me how she plays with the squirrels in Central Park. When she goes to the park, she always carries a bag of peanuts for them. She sits down on the walk and they gather all about her for the nuts. Some of them come and eat out of her hands. Others wait until they think she is not looking, run up, grab a nut, run away, and eat it at a safe distance. Some of them, however, will never come near her, no matter how much she coaxes them. For these timid ones she always leaves some nuts nicely shelled.

THE FLYING SQUIRREL

There is one squirrel who is up and doing only at night. All day he is rolled up in a small furry ball. But at night how he flies about, building his house or storing up nuts. This is the flying squirrel. Unlike other squirrels, he has a strong, elastic fold of skin between each fore and hind leg. These folds are partly held up by the bony part of the feet. When the squirrel leaps, they spread out, something like wings, and break his fall.

Although this squirrel is called a flying squirrel, his way of getting through the air is not like that of a bird. He cannot fly upward. His flight is only a long-drawn-out descent. He drops quickly in a slanting direction, holding out his legs straight and stiff from his body and making his body itself broad and flat. His tail acts something like a rudder.

Animals of the Arctic

(*Continued from page 49*)

The male reindeer has branching antlers. These fall off in the month of November and new ones grow in the spring.

The reindeer lives on moss, twigs, and lichens. It constitutes the chief wealth of the Laplander, some having herds of two thousand or more. The milk is used for cheese and the flesh for food; the sinews for thread; the fat for oil and the bones for needles and tools. The reindeer is especially valuable as a draught animal for which purpose it is harnessed to sledges. He travels about ten miles an hour and can draw a weight of two hundred pounds besides the sledge.

THE WHITE POLAR BEAR

The great white polar, or ice bear, is recognized as belonging to a distinct class of bears. Its features are unlike those of other bears. The head is long and pointed, the body elongated, the limbs slender, the feet hairy-soled, and the coat cream-white. They are large animals, sometimes ten feet in length and very strong. They are numerous in Arctic regions. They feed upon fish, young walrus, and young seals, sometimes swimming for miles in search of food. Often the food is found in the surf and in the coast rivers where the fish come to spawn.

THE WALRUS

The walrus is distinguished from other polar animals by its tusks which grow from the upper jaw as largely developed canine teeth, downwards and slightly inward fifteen inches or more in length. These tusks serve the animal as weapons and as tools in digging mollusks, upon which it mainly lives, or in climbing rocks on the shore. The walrus is a large animal, often twelve feet in length with a girth nearly as much. The eye of the walrus is small; the external ear is lacking though the orifice is visible.

The walrus is yellow-brown in color. The hide is very tough and thick so that it can be penetrated by a bullet only with great difficulty. It is used by the Eskimo for dog harnesses. The walrus is abundant along the seashore. It is a quiet, inoffensive animal unless it is attacked or when its young are in danger. Then it fights desperately. Owing to reckless slaughter of years past, they are greatly decreased in number.

THE SEAL

Seals are found in the North Pacific Ocean and in Behring Sea; on the shore of Eastern Labrador and Western Greenland. There are two great types of seals: the fur seal, which yields the sealskin of commerce, and the hair seal, which yields a valuable oil and leather.

The hair seal is the one seen in the circus. The face is small and short; the ear is small. He has feet with long claws. The posterior limbs only are used in swimming and do not bend forward at the knee. The seal swims through the water quickly. When on land he cannot walk or run, but wriggles along. The head and neck can be raised as in the bear. They have five toes on each limb, joined together by webs. They have a short tail joined beyond the middle to the hind legs by the skin.

For some reason seals sometimes swallow large stones. They breathe slowly, having only about thirty respirations per hour. They have the most curiosity of all polar animals. They will come quite close to ships, as if curious to see them. They are particularly attracted by musical sounds. Often they will gather on shore in large numbers at the sound of ringing bells or other music. They take good care of their young. They prepare for them a small igloo in the ice near the shore. The baby seal makes a curious noise when hungry or frightened. By imitating this noise, the Eskimo hunters catch many. The mother seal rushes forth at the sound which she thinks is made by the baby seals, and so is easily captured or shot.

The fur of the seal is valuable. Every year thousands are killed by hunters to satisfy the demand of commerce.

Rabbits, Squirrels, Turtles

(*Continued from page 28*)

He likes to climb.
He likes to play.
He likes pecans.
He lives in this cage.
His name is Bobbie.

OUR RABBIT

Our rabbit is pretty.
He is white.
He has pink eyes.
He has long pink ears.
He likes to hop, hop, hop.
He lives in this hutch.
His name is Joe.

OUR TURTLES

Our turtle is pretty.
He likes to crawl.
He pulls his head into his shell.
He pulls his legs and tail into his shell.
He likes meat and lettuce.
He lives in this glass bowl.
His name is Tim.
Peanut is a turtle, too.
He lives with Tim.

HOW IT HELPED OUR READING PROGRAM

The making and reading of these charts were delightful experiences, as they were the results of actual observations of the live specimens. This work greatly motivated our reading program. The children learned to read the little stories quickly as they were simple, meaningful, and interesting

Now we were ready for the next step which was to get pictures of foods and enemies of the pets. As a result, attractive charts were made with the pictures and word labels bearing titles such as: "What Tim Eats," "Enemies of Our Pets."

Many other facts were learned other than the ones listed by the groups, such as:

How the pets live in their woodland homes
How they live in winter
Their use to man
The damage they do to man

The unit can go on and on, as the child's interest in animals is ever constant. Daily they observe something new. We brought the study to a close after four months.

It culminated with the group giving an assembly program in the form of a playlet in two scenes. During the first one, the children introduced our pets to the audience. They then gave a résume of the things which they had learned and the experiences enjoyed.

The second scene carried the audience on an imaginary trip to the woods to see the pets in their natural environment. Here they dramatized in song, speech, and dance the activities of the pets with their animal friends in the woods, assisted by Sun, Rain, and Spring, which were all necessary to help awaken the animals from their winter sleep.

OUTCOMES AND ACTIVITIES

1. Stories were read to the children and before the close of the unit they were able to read short simple stories themselves. Some of these were read for enjoyment, dramatization, some for retelling, while others were purely informational.

2. They learned many songs and poems.

3. They studied the painting, *The Boy and the Rabbit.*

4. They played games: Squirrel and Trees, Squirrel and Nuts, Animal Imitations.

5. They made folders for their work which were displayed at the P. T. A. meeting. Each folder had the picture of a pet colored and its name written under it.

6. They made freehand drawings, booklets, and clay models.

7. They saw the sound film, "Adventures of Bunny Rabbit;" film strips, "Peter Rabbit" and "Farm Animals;" slide, "A Rabbit."

They listened to a recording of "Peter Rabbit."

8. They did the following types of checks:

(a) Match names with pictures.

(b) Interpret action sentences. (Example: Crawl like a turtle.)

(c) Read, guess and make riddles.

I am little.
I can hop.
I have pink eyes.
Draw me.

(d) Read and answer YES or NO.

Is Tim a turtle?
Is Bobbie a rabbit?
Does Joe eat meat?
Does Tim have a shell?
Does Joe have strong legs?
Does Peanut hop?

INTEGRATED SUBJECTS

Opportunities for language learnings were ever present.

The importance of health in caring for our pets was stressed and compared with the good health habits the children themselves should have: cleanliness of homes, proper food, clean fresh water, regularity of meals.

Experiences in art were enjoyed through coloring, drawings, and modeling animals.

Painting boxes for assembly program and for turtles' house.

Cutting out covers for turtles' stand.

The children's vocabularies were constantly enlarged.

Association with an observation of these pets made a far more lasting impression than any amount of mere reading would do. A very convincing event took place almost a month after our assembly program. Our turtle awakened from four months of slumber in his bed of mud. The children immediately recognized what was happening. They knew what food was necessary and how to care for him. Two boys purchased some beef, and what a thrill it gave them to see the turtle eat his first meal since October.

Preparing for Winter

(*Continued from page 30*)

viewed the discussion of animals and recalled the discussion of grasshoppers and crickets. First it was understood that while these creatures are called insects, they are really little animals. The children knew that many grasshoppers and crickets die, but did not know that many of these had laid eggs. It was explained that the eggs did not have to be kept warm and that they were laid near food.

Everyone knew the story of the caterpillar and was eager to talk about its long sleep.

The picture of the beetle was new to them. A few children had seen beetles but no child had any idea of what happened to them. The fact that beetles and similar insects crawl into the ground and sleep caused one boy to remark, "Maybe they think they're bears."

To vary the lesson, the book "Do You Know" was used. As teacher showed pictures, children discussed them.

PART III

How Plants Get Ready for Winter

In line with the main thought the objective here was to see what had happened to things we had seen, plants in our gardens, wild flowers, trees.

The lesson started by playing a game which reviewed the first two parts of the unit. The teacher had printed riddles on small cards. A child read a riddle to the class and chose someone to answer it. Sample riddles follow:

I am little.
I have a long bushy tail.
I store nuts for winter.
Who am I?
and
I am very small.
I curl up inside a cocoon.
I sleep until spring.
Who am I?

Then the teacher remarked that the children now knew about animals, but that we had not talked about plants. Most of the class thought all plants died. However, one little girl said she thought some plants must just sleep because she had seen people covering them up. Another child told about the iris in her garden. The children decided that leaves and stems of some plants do die, but that the roots are alive and, in the spring, new stews and leaves will grow.

In thinking about wild flowers, it was decided that these do die, but before this happens, the flowers have made seeds that will grow into new plants in the spring.

The children were amazed that a tree is a plant. When proof had been established, they were eager to talk about the changing color of the leaves and their falling off. Most of the class thought that trees died and then by means of some magic trick came alive in the spring. Further discussion of the tree as a plant cleared this up. They saw that the branches, trunks and roots stay alive all winter. It was pointed out that some trees did not lose their leaves and stayed green all winter. They were told that these were evergreen trees.

The Spinning Lady of Spiderland

(Continued from page 7)

she adds other spokes and many crossings at the center so as to make a stout hub in the wheel-like structure. Starting at the hub, she spins about it a series of spiral lines, each time widening her circle. These lines form the scaffolding for her structure.

Starting at the outer rim of her circle, she then begins to spin with a new brand of silk which is much finer and is well coated with a sticky substance. This thread catches and holds unwary insects. Round and round she spins, until she reaches the center. Sometimes, she runs out beyond her web a taut tap line and hides herself behind a leaf or other convenient screen. The slightest disturbance in the web is carried to her through this line.

THE SPIDER'S ANATOMY

This interesting creature is not, as is often thought, an insect, but belongs to the class *Arachnida*. The spider has eight legs, while the insect possesses but six. The four pairs of legs are attached to the thorax. Each leg consists of seven segments, terminating in two or three claws. The head and thorax of the spider are in one segment and are connected to the abdomen. The spider has two claw-like appendages, called *chelicerae,* extending from the head, instead of the antennae of the insect. Near the top of each claw is the opening of the poison glands.

The organs with which the spider does its spinning are located at the rear of her sack-like abdomen. Most spiders have three pairs of these spinnerets. A view of these organs through a microscope would reveal perhaps a hundred tiny spinning tubes over each spinneret, from which the silk threads are expelled.

OTHER KINDS OF SPIDERS

Mrs. Aeronautic Spider finds many other uses for her silk besides weaving it into webs. Sometimes she wishes to catch insects that are floating about in the air. This wise lady knows just how to go about manufacturing her own aircraft. She crawls to a high, wind-swept position, spins out silk, and weaves it into a sort of parachute. The wind catches this and bears the lady flier up and away, sometimes for miles. How does she get down? Easily enough, for she has but to spin a drop-cable and lower herself upon it.

The Trap-door Spider digs tunnels in the ground and, with her silk and a mixture of mud, fastens over her home a neat, close-fitting door. Some of these tunnels act as traps. They are held shut only by a gossamer thread which breaks the instant a hapless victim touches it. Then the prey is plunged into the tunnel to be devoured. Others have doors which are carefully widened at the top and fitted so securely as not to allow any intruder—such as the centipede, the cousin and arch-enemy of the spider—to enter.

Perhaps the species of spiders most feared by the human race are the Tarantula and the "Black-Widow" Spider. Both are said to have caused death by their bites. Certainly the bites of some spiders cause much suffering and distress, so it is well for children to let them all entirely alone, and to admire their peculiar talents at a distance.

QUESTIONS

1. Which is the most energetic and important member of the spider household?
2. Why is Mr. Spider not as independent as his wife?
3. Is a spider an insect? Show some differences between insects and spiders.
4. How does Mrs. Spider know at once when she has caught an insect in her web?
5. How many eyes has a spider?
6. Tell what you think is wonderful about the spider's method of making her home.
7. Draw a picture showing how the spider begins to spin.
8. Tell how Mrs. Spider is something like the "Man on the Flying Trapeze."
9. Have you ever seen a spider web that seems to hang in mid-air? Where?
10. Tell why some spiders are called "trap-door" spiders.
11. What are some of the most dangerous spiders?
12. Tell why it is best not to handle spiders.
13. Should you admire their lacey webs? Why?
14. Read the old poem "The Spider and the Fly" and draw a picture to illustrate it.

Rabbits

(Continued from page 39)

es himself with
a. tail b. paws c. tongue
8. He likes to drink
a. water b. oil c. gasoline

3. Directions to follow.
Read the story "The Little Old Woman and Her Rabbits."
1. Draw the little old woman.
2. Color her dress blue.
3. Draw her garden.
4. Color the vegetables.
5. Draw Mrs. Rabbit in her garden.

4. Yes and No questions.
1. Are cottontails wild rabbits?
2. Do they have brown fur in winter?
3. Do they have short ears?
4. Are their hind legs a great help to them?
5. Are their noses always in motion?
6. Do they like the briar patch for their homes?

5. Matching sentences to pictures.
Place pictures on the chalk tray. Write informational sentences about these pictures. Number pictures and sentences and match them.

6. Matching words. Descriptive words.

1. fur	1. pads
2. nose	2. stumpy
3. mouth	3. three-cornered
4. tail	4. brown
5. ears	5. strong
6. feet	6. wild
7. legs	7. sensitive
8. cottontails	8. long

7. Completion sentences.
1. Rabbits have many .....
2. A rabbit freezes when he is in .....
3. Rabbits are sometimes killed by .....
4. Rabbits are sometimes run over by .....
5. Rabbits are sometimes caught in .....
6. Rabbits are sometimes eaten by .....
7. Rabbits are sometimes killed by bad .....
8. Rabbits are very good .....

1. dodgers	5. automobiles
2. traps	6. weasels
3. danger	7. enemies
4. hunters	8. boys

8. Free story illustration.
Read a rabbit story to the pupils. Let them illustrate it with their crayons.

9. Matching parts to make them true.
1. A wild rabbit is .....
2. A tame rabbit should be .....
3. Rabbits have .....
4. When an enemy is near .....
5. A baby rabbit follows .....
6. A rabbit keeps .....
7. A rabbit's flesh is used .....
8. A rabbit learns .....
1. many enemies
2. very clean
3. a rabbit freezes
4. his mother's cottontail
5. always in danger
6. fed three times a day.
7. to keep out of danger.
8. for food

The Frog Unit

(*Continued from page 19*)

Tree frogs

1. A tree frog is very ..... a. small b. clumsy c. large
2. His color may be ..... a. yellow b. gray c. pink d. brown e. green
3. On the bark of a tree he looks ..... a. green b. brown c. yellow
4. For hours a day he ..... a. jumps b. sits c. climbs
5. On the bottom of his toes is a ..... pad. a. round b. big c. sticky
6. Tree frogs can ..... and ..... a. dance b. climb c. laugh d. swim

5. Yes or no
   1. Tree frogs change colors.
   2. Tree frogs are large.
   3. Tree frogs are good jumpers.
   4. Tree frogs work all day.
   5. Tree frogs are good swimmers.
   6. Tree frogs are six inches long.
   7. Tree frogs have sticky pads on their feet.
   8. Tree frogs could walk on window panes.
   9. Tree frogs like cool, damp places.
   10. Tree frogs are larger than leopard frogs.

V. INFORMATION GIVEN TO PUPILS

A. Frogs in general.

Frogs are found in all parts of the United States except where it is hot and dry. They are first cousins to toads. They have a moist, clammy skin without scales. All lay their eggs in water in jellylike masses. All pass through a tadpole stage.

B. Leopard frogs.

The common leopard frog is found throughout the country. It has rows of black spots on back and legs. The under side is light, like that of all frogs. Its life is an example of frogs in general. The eggs are found in water a foot or less deep. The female lays her eggs in a single mass of jelly. A small frog may lay from two thousand to three thousand eggs. A large frog lays six to eight thousand eggs. Each egg is black above, light below, and one-sixteenth inch in diameter. When first laid, the mass is as large as a teacup, but swells up in the water.

The egg hatches out into a pollywog. In a few days it has gills for breathing, a tail for swimming, and a pair of horny beaks with which it nips off bits of vegetation. A tadpole grows to be three or four inches long. Then he begins to sniff air into his lungs. As he sniffs, his lungs grow larger, his gills get smaller. His tail gets shorter and shorter until it is absorbed. His arms and legs have grown. He is prepared for life on land.

A frog has moist skin, large, prominent eyes, smooth drumheads of the ears back of the eyes; a mouth with a wide gape; a long tongue, loose behind and capable of being flipped out to catch his prey. He has small arms and hands with four fingers each, large, powerful legs and feet with five webbed toes. A frog lives in marshy places. He absorbs water through his skin. He hibernates all winter. In the spring, the eggs are laid by the female. A frog is not full grown until he is five years old.

He may live from ten to twenty years. A frog captures mosquitoes and insects that pester man and animals. Frogs' legs are a great delicacy.

C. Tree frogs.

Tree frogs are small. They are never more than two inches long. They may be gray, green or brown. If they rest on a leaf, they may be green. If they cling to the gray bark of a tree, they are gray. They sit for hours and never move. A true frog hunts for food at night. The tree frog catches ants, gnats, flies, and lightning bugs. The bottom of each toe has a sticky pad, which catches and holds whatever it touches. A tree frog is a good jumper and is not afraid of falling. Tree frogs are good swimmers. Their toes are webbed. They look for cool, damp places.

D. Peepers.

The singing of spring peepers is one of the first signs of spring. Some peepers seem to be gray, some yellow, some brown, some almost black. They change their colors to match what they are sitting on. Because of this, it is hard to find them. A peeper is about one inch long. To see one of these frogs peeping is a funny sight. He begins by puffing out his throat like a bubble. Bigger and bigger the bubble grows until it is half as large as he is. Then it begins to get smaller again and you hear the frog's sweet little call. When the bubble is gone, the peeping stops.

The eggs of a peeper are tiny. They look like small seeds. The mother fastens them to stems in the water. Soon the tadpoles are swimming about. These little frogs hide in all kinds of places. Some hide and hunt in heavy vines. Others climb tall ferns. Some of them climb to the tops of tall trees. Spring peepers are quiet in midsummer—but late in fall you can still hear them peeping.

Wild Animals

(*Continued from page 42*)

long neck	hump
two stomachs	tusks
stores fat	roars
strong tail	wicked
hang by his tail	jungle
long trunk	desert
afraid of water	lioness
do tricks	cub
climb trees	paws
tough skin	catlike
lonely	tallest
graceful	strongest
spotted	playful

3. Seatwork.
   a. Match animal names to pictures.
   b. Yes-No question. A lion has a heavy mane.
   c. Blank Filling.

The ..... has a long trunk.

   d. Multiple Choice.

A giraffe is { wicked. / wise. / lonely.

A camel lives in the { desert. / jungle. / farm.

   e. Classification—wild—tame

cow	lion	giraffe
pig	horse	tiger

   f. Match descriptive word or phrase to animal's name.

1. lonely	camel
2. roars	giraffe
3. wicked	tiger
4. hump	lion

   g. Matching. Which one?

1. has cushions on his feet	camel
2. gets fruit from tall trees	monkey
3. is afraid of water	giraffe

4. Art.
   a. Draw pictures of animals for booklet.
   b. Draw large pictures for easel.
   c. Make a merry-go-round.
   d. Make clay and plasticine animals.
   e. Make cages for animals.

Animals and Flowers

(*Continued from page 45*)

e. ..... is a preacher.
f. A ..... has little curly leaves on its stem.
g. We do not like..... on our lawns.
h. The..... is like a cup.
i. The..... grows in a very wet place.
j. The..... is a tiny purple flower.

marsh marigold	violet
dandelion	tulip
Jack-in-the-pulpit	carnation
trillium	arbutus
rose	pansy

Key

rose	carnation
pansy	dandelions
trillium	tulip
arbutus	marsh marigold
jack-in-the-pulpit	violet

Write in the spaces at the right of each sentence the word "yes" if the statement is true, or "no" if it is false.

1. A rose has just three white petals. ( )
2. A tulip has a little face. ( )
3. Pansies have many colors. ( )
4. Arbutus grows on a tree. ( )
5. A trillium has prickers on its stem. ( )
6. Flowers need sun and water. ( )
7. The roots get food for the plant. ( )
8. We like to have dandelions on our lawns. ( )
9. Jack-in-the-pulpit likes a shady place. ( )
10. Pansies grow in the woods. ( )
11. Violets are big flowers. ( )
12. The leaves take air to the plant. ( )

Key

1. False	7. True
2. False	8. False
3. True	9. True
4. False	10. False
5. False	11. False
6. True	12. True

Spring's Awakening

(*Continued from page 25*)

very sharp claws on all four feet.
h. Only father toad can sing.
i. As soon as a toad can hop he lives on the ground.
j. A toad likes to live in a garden.
k. He eats our vegetables.
l. A frog likes to live near the water.

2. Completion.
Can you put in the missing letters?
a. Something that hops. - - og (frog)
b. Where a frog often sits. - og (log)
c. A Spring month. Mar - (March)
d. Something bees like. - - owers (flowers)
e. Something that helps flowers to grow. - - owers (showers)
f. Where the birds have been all winter. Sou - - (South)
g. What the wind does. - - ows (blows)
h. Where some frogs live. - - ee (tree)
i. All frogs can sw - -. (swim)

3. Matching.
Do you know which animal each sentence tells about?
List the number of each sentence under its proper heading.
I. Frogs II. Rabbits
a. My eyes are on top of my head.
b. My hind legs are good for jumping.
c. My tail is like white cotton.
d. I like the water.
e. I eat bugs, flies, and insects.
f. I eat garden vegetables.
g. My coat changes color in the spring.
h. I lay my eggs in the water.
i. I thump with my hind legs.
j. My throat looks like a bubble when I sing.

4. Yes and No Questions.
a. Are baby toads called tadpoles?
b. Does mother toad lay eggs in the water?
c. Do frogs sometimes freeze in the winter?
d. Is a frog's tongue like our tongue?
e. Is the wind always from the North?
f. Do rabbits change color in the Spring?
g. Does sap for maple syrup come from oak trees?
h. Will people who handle frogs and toads have warts?

5. Classification.
Write the numbers of the sentences in the right columns.
bear | toad | rabbit | cub | frog |
1. He will climb trees to get honey.
2. He uses his eyes, ears, nose, legs, and wits to save himself.
3. He thumps on the ground to let his babies know when danger is near.
4. He keeps the garden clean from insects.
5. Eats his skin when he changes it.
6. His foot tracks look like a man's tracks.
7. They are always born in pairs.
8. His tongue flaps like a rubber band.

6. Multiple Choice
Pet Rabbits.
a. A rabbit is a 1. good pet. 2. good playmate. 3. good animal.
b. 1. A hollow tree
2. A hole in the ground
3. A big box
makes a good home for a pet rabbit.
c. A pet rabbit needs 1. one meal a day. 2. two meals a day. 3. three meals a day.
d. A pet rabbit needs 1. little care. 2. no care. 3. much care.
e. A rabbit should get fresh water 1. three times a day. 2. once a day. 3. once a week.
f. Rabbits should have 1. food that is cooked. 2. food that is not cooked. 3. food that is hot.

RABBITS

7. Questions.
Read the story, then answer each question with one or two words.

Wild rabbits have to take care of themselves. They live in the fields and near the woods. Animals try to catch them because they are good to eat. Rabbits can not fight very well. They use their eyes, ears, nose, legs, and wits to save themselves.

They eat roots, berries, fish, bark and green leaves.

A briar patch is most always a safe place for a rabbit.

a. Who takes care of the wild rabbits?
b. Where do they live?
c. Can a rabbit fight?
d. Write the name of one thing he uses to save himself.
e. Write the name of one thing he eats.
f. Where does a rabbit find safety?
g. Why do animals try to catch them?

TURTLES

1. Are all turtles alike?
2. Do turtles have teeth?
3. Can a snapping turtle bite?
4. Are snapping turtles small?
5. Does his shell protect him?
6. Is his shell big enough for his body?

Seals

(*Continued from page* 51)

ones showing which are best fitted for seal hunting.

11. Solving problems, such as: If there are 300 men on board ship and they catch 1400 sculps, how many does each man get when they are divided?
If a quintal is 112 lbs. and a ship carries 110 quintals of dried codfish, how many lbs. of it are on board?
12. Reporting on methods of workin ship through the ice.
13. Comparing:
(a) catching of fur seals
(b) catching of harps
(c) catching hood seals
14. If possible, visiting a circus or zoo to watch seals.
15. Modeling seals, ships, weapons.

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Teaching Geography

(*Continued from page 26*)

DISTANCE

Develop concepts of inch, foot, yard, mile. Develop this study through activities, such as building the playhouse.

DIRECTION

Right-hand, left-hand. Teach cardinal points of compass. Then teach the semi-cardinal points as needed. (Note: At this point have little exercises or games to teach children how to apply what they have learned about direction. For example: Let a child pretend that he is standing in front of the post office. A stranger asks the child to direct him to the schoolhouse, which the child does. The teacher at the schoolhouse wishes to visit the child's home on Saturday. Ask the child to give her the directions for finding it.)

It is important for small children's safety that they get a good idea of direction as soon as possible.

Some good nature myths (Consult books of myths at library). Hermes, Apollo, Arachne, Ceres, Clytie, Iris, Snow Maiden, The Poplar Tree, Golden Rod and Aster, Baucis and Philemon, Aeolus and the Winds, The Wind and the Sun, The Red-headed Woodpecker, The Wise King and the Bee, How the Robin's Breast Became Red, How the Chipmunk got the stripes on his back.

Typical Poems:
"Sweet and Low"—Alfred Tennyson.
"Seven Times One"—Jean Ingelow.
"Bed in Summer"—R. L. Stevenson.
"The Brook"—Alfred Tennyson.
"The Brook and the Wave"—Henry W. Longfellow.
"Lady Moon"—Lord Houghton.
"The Stream"—Eugene Field.
"If I Were a Sunbeam"—Lucy Larcom.

We Study Bees

(*Continued from page 10*)

3.....Are bees an injury or a benefit to the flowers they visit?
4.....Tell about the three classes of honey bees.
5.....What is a drone? Why is it given this name?
6.....Who rules the hive?
7.....What is the queen's special function?
8.....How many queens does one swarm have?
9.....How long does a queen bee live?
10.....How long does a worker live?
11.....How many eggs can a queen lay in a day?
12.....How long does it take the eggs to hatch?
13.....How are the hives ventilated?
14.....How long after the egg is hatched, does the fully developed bee appear?
15.....Why do bees swarm?
16.....Will they swarm without a queen?
17.....What happens to honey bees in winter?
18.....Is bumble bee honey good to eat?
19.....What uninvited guest does the bumble bee have?
20.....Name the solitary bees.

ANSWERS

1.....Nectar of pollen
2.....Bee bread
3.....Benefit
4.....Queen-ruler lays eggs, drones do nothing, workers find and bring back food, guard hive and queen.
5.....Male bee—Never does any work
6.....Queen bee
7.....Laying eggs
8.....One
9.....Five or six years
10.....Six weeks
11.....As many as six thousand
12.....About five days
13.....By workers flapping wings
14.....About two weeks
15.....Hive crowded
16.....No
17.....Drones driven out and die—Queen and workers rest
18.....No
19.....Parasite
20.....Carpenter bee, Mason bee

II.....TRUE.....FALSE

1.....Bees are a benefit to the flowers they visit.
2.....Each hive has one queen.
3.....Workers are not permitted to sting queens.
4.....Drones are cared for all winter.
5.....Bees sting everybody.
6.....Workers flap their wings to ventilate the hives.
7.....The stinger is the bee's weapon for attacking enemies.
8.....Every bee colony has three kinds of bees.....workers, drones and queen.
9.....The workers feed the queen and keep her clean.
10.....Workers take turns acting as guards.
11.....Many people make a business of raising bees and selling honey.
12.....The wax that bees make for their combs is not useful.

ANSWERS

1.....true	5.....false	9.....true
2.....true	6.....true	10.....true
3.....false	7.....true	11.....true
4.....false	8.....true	12.....false

III.....Complete the following

1.....Honeybees live in ———
2.....The leader of a swarm of bees is called a ———
3.....The ——— lays the eggs.
4.....——— is an excellent food.
5.....Many bees in a hive are ———
6.....———is the way bees protect themselves.
7.....——— bees may live as long as five years.
8.....A ——— bee is stung to death when she can no longer lay eggs.
9.....Bees are guided to flowers chiefly by ———
10.....A bee community is a perfect example of ———

ANSWERS

1.....hives	6.....stinging
2.....queen	7.....queen
3.....queen	8.....queen
4.....honey	9.....smell
5.....workers	10.....cooperation

IV.....Fill in the blanks with the following words.

community	hobby	cooperation
pollen	bees	nectar
crops	honey	queen

Besides making honey and wax——1—— help farmers and gardeners in other ways. The carrying of ——2—— about from one plant to another is often done by bees as they gather ——3——. Many of the farmer's ——4—— would not produce if the bees did not carry ——5—— from one plant to another. Bees are such useful and interesting insects that some people make a ——6—— of raising them. Bee life is a study in ——7—— and ——8—— life.

ANSWERS

1.....bees	5.....pollen
2.....pollen	6.....hobby
3.....nectar	7.....cooperation
4.....crops	8.....community

The Zoo

(*Continued from page 53*)

visited Prospect Park Zoo. So they were anxious to have a stand in our zoo. They made a small stand out of two wooden boxes. One child brought some small paper bags for the peanuts. Several children printed the words "Jumbo Peanuts" on them. They filled the bags with torn newspapers and then placed them on the stand. An attendant was selected to "sell" the peanuts. An appropriate hat was also made for him. Many problems in arithmetic were developed in this phase of the activity.

CONCLUSION

When the zoo was completed, a head keeper, several keepers and guides were selected to operate it. Invitations were written by the children and sent out to guests. The head keeper welcomed visitors and the guides conducted them through the zoo. The keepers were stationed at various cages to tell about their animals and answer questions. The attendant at the Information booth distributed the booklets and answered questions.

Signs of Wild Life

(*Continued from page 35*)

ed up on a branch close against the side of a tree, their tails close over their backs, and their feet tucked well in under them.

Bobwhites, redpolls, and goldfinches, on sunny days, leave their tracks in weedy fields. A storm drives them to the shelter of the woods or to some other protected place. The bobwhites, or quail, snuggle close together under tall grasses, or in some thick vegetation, to spend the nights and to weather out rough winds. When there is snow in such places, you will find it fairly trampled down by their numerous little feet. The bobwhite's track is exactly like that of a ruffed grouse, only smaller.

Insects

(Continued from page 8)

b. eggs carried from room to room
4. development of the young
a. egg
b. larva (fed honeydew by workers)
c. cocoon
d. young ant
5. war-like methods between different species of ants

E. Problem: Are ants useful or harmful?
1. farmer ants make gardens in their underground homes
2. carpenter ants destroy wood
3. red and black ants make the ground porous

WASP

A. Hornet
1. Problem: How would you recognize a hornet?
a. brown in color
b. looks like an enlarged ant with wings
2. Problem: What do hornets eat? (fruit juices)
3. Problem: What kind of nest does the hornet build?
a. pear-shaped with an opening at the bottom
b. material (paper)—wasps were the first paper makers
c. location (branch of tree)
4. Problem: What is their mode of life?
a. development of the young
(1) egg; (2) larva; (3) cocoon; (4) young wasp
b. queen alone survives the winter
5. Problem: How is the hornet useful to us? He showed us how to make paper.
6. Problem: How does the yellow jacket compare with the hornet?
a. appearance
(1) smaller
(2) color—yellow and black
b. home and mode of life
(1) also social
(2) nest of paper—hexagonal celled combs
(3) nest underground
(4) irritable: have painful stings

B. Mud dauber
1. Problem: Where and how does this wasp construct its home?
a. material—mud mixed with juice from her mouth
b. four rooms
c. location
(1) fastened to flat stones on ground
(2) along a stream
2. Problem: What is work and mode of life of the mud dauber wasp?
a. solitary
b. puts poisoned caterpillar or spider in each room for home-food for young
c. development of young
(1) egg laid on top of caterpillar or spider
(2) larva eats caterpillar or spider
(3) cocoon
(4) young wasp

GALL FLY

A. Problem: How would you recognize a gall fly?
1. an insect,
2. color—grayish black with dark wings
3. wings, two in number
4. similar in appearance to ordinary house fly

B. Problem: What is the gall fly's mode of life?
1. solitary
2. development of young
a. eggs laid on stem (may be a goldenrod)
b. maggot within gall
(1) gall-swelling of the stem
(2) food—inside of gall
c. cocoon
d. young gall fly
3. grown fly leaves the gall

SUMMARY

A. Comparison of the insects (Oral)
1. appearance; (2) food; (3) home; (4) development of young; (5) work; (6) usefulness
B. Observation of beehive preceded by questions to guide observation.
C. Correlate study of insects with art, reading, English (oral and written) and writing.
D. First hand observation of insects in school room and on school grounds.

The Turtle

(Continued from page 27)

head and legs into this shell, it is practically immune to attack from its enemies.

Turtles are cold-blooded. This means that their temperature does not remain constant but that it fluctuates with the temperature of the water in which they live. The turtles' temperature usually remains about one degree above that of the water. Thus, if the water were 40° F., the turtles' temperature would be about 41° F. When the water is warm, the turtles are very active. When it is cold, they do not move about much.

All turtles have a similar life history. The females begin to lay eggs when they are eight to twelve years old and continue to do so for many years. In fact, it has been said that turtles may live more than 100 years.

The female lays her eggs on the land and immediately forgets them. The heat of the sun hatches the eggs in a few weeks and the baby turtles dig to the surface and make their way to the water. They spend most of their first year seeking food among the dense water plants along the shore.

Baby turtles have many enemies. Most predacious animals eat them. Since their shell is tender and soft, skunks, 'possums, fish, frogs, snakes all find them delicious tidbits.

Turtles grow rapidly the first summer and almost double their size. They eat tremendous quantities of fish and frog eggs, algae, and water insects. By the end of the second summer their shell has hardened and they become more active.

Turtles move about the lake and feed on injured fish and lazy cray-fish. They become scavengers of the lake. Although they relish an active healthy fish, they can not move fast enough to catch these fish and so must be content with those that are sick or injured, and the ones they can steal from the fisherman's line.

Turtles grow slowly after the first two summers, and become mature after eight to twelve years.

In parts of the country where the water becomes extremely cold during the winter, turtles seek a warm place deep in the mud and remain there throughout the winter.

Although most fishermen consider them pests, turtles probably do much less harm then they are accused of, and are undoubtedly of value as scavengers.

In many parts of the country, turtle meat is considered a delicacy. Some persons earn their living catching turtles for city markets.

QUESTIONS

1. In making a home (aquarium) for turtles, should you plan to have the turtle stay in water all the time? Why not?
2. Tell how you will provide for this.
3. What do turtles eat when in their native environment? What can we feed them in the aquarium?
4. What is meant by saying that turtles are scavengers?
5. What is meant by saying that turtles are predators?
6. Do turtles do more harm than good to man? Why?
7. How many kinds of turtles are there? Describe them.
8. How do turtles protect themselves from attack? Have you ever seen a turtle do this? Describe?
9. In cold climates, how do turtles spend the winter?
10. How old have turtles lived to be?
11. What kind of feet have turtles?
12. How could you tell by their appearance that turtles can catch and eat heavy food?
13. Are turtles ever used as food for man?
14. Why do we sometimes hear a person called, "As coldblooded as a turtle"?

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